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THE

**JOURNAL**

OF

**THE ASIATIC SOCIETY**

OF

**BENGAL.**

—

**VOL. I.**

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THE  
**JOURNAL**  
OF  
**THE ASIATIC SOCIETY**  
OF  
✓  
**BENGAL.**



EDITED BY

JAMES PRINSEP, F. R. S.

SECRETARY OF THE PHYSICAL CLASS, ASIATIC SOCIETY.

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VOL. I.

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JANUARY TO DECEMBER,

1832.

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“It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science, in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta; it will languish, if such communications shall be long intermitted; and it will die away, if they shall entirely cease.”

SIR WM. JONES.

---

Calcutta :

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1832.





TO  
**CAPTAIN JAMES D. HERBERT,**

**Bengal Infantry,**

LATE

DEPUTY SURVEYOR GENERAL OF BENGAL, AND SUPERINTENDENT  
OF REVENUE SURVEYS;

AT PRESENT HOLDING THE APPOINTMENT OF  
ASTRONOMER TO HIS MAJESTY

**The King of Oude:**

WHOSE JUDGMENT ORIGINATED; WHOSE PERSEVERANCE AND EXERTIONS SUCCESSFULLY  
ESTABLISHED; AND WHOSE SUPERIOR ABILITIES SUPPORTED FOR 3 YEARS,

THE FIRST JOURNAL

IN INDIA

DEVOTED TO THE EXCLUSIVE PUBLICATION

OF

**GLEANINGS IN SCIENCE;**

THIS VOLUME,

IN ALL RESPECTS, BUT TITLE, A CONTINUATION OF HIS OWN WORK,

IS

**Inscribed,**

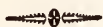
BY HIS ATTACHED FRIEND,

**THE EDITOR.**

CALCUTTA, }  
*January 1, 1833.* }



## PREFACE.



THE ASIATIC SOCIETY, on the 7th March, 1832\*, passed a resolution, that the monthly journal hitherto published under the name of "GLEANINGS IN SCIENCE," should be permitted to assume that of JOURNAL OF THE ASIATIC SOCIETY, and to continue it as long as the publication remains under the charge of one or both of the Secretaries of the Society. This privilege has, as it was anticipated, been the means of extending very considerably its circulation, while it has given a character and authenticity to the work, by its connection with an institution of established literary reputation, which no anonymous magazine, however well conducted, could hope to command.

The advantages of extended circulation have reacted to the benefit of subscribers, by enabling the Editor to increase the quantity of letter press from 400 to nearly 600 pages; and yet so constant has been the growing support of its contributors, that the pages of THE JOURNAL have been devoted, with few exceptions, to the insertion of original communications.

To many readers it would doubtless have been preferable that THE JOURNAL should contain more copious extracts from English scientific periodicals, which are not procurable in the interior of India; but conceding that, as an organ of Indian scientific intelligence, it must obviously derive its only merit among the many similar periodicals of the present day, from its stores of *oriental* literary and physical research, it will be generally acknowledged, that the first object of the work should be to give publicity to such oriental matter as the antiquarian, the linguist, the traveller, and the naturalist may glean, in the ample field open to their industry in this part of the world. While acting

\* The January number was not published until the middle of March.— Since then exertions have been made to bring up arrears, and in future each monthly number will appear with regularity on the 10th of the following month; the insertion of the meteorological register rendering an earlier issue impossible.

on this principle, however, the Editor has not lost sight of the great utility of following, as far as means would permit, the progress of the various sciences at home, especially such as are connected in any way with Asia; the only limits thereto being want of space, and want of time to peruse and extract from the vast number of publications of the present day. Want of room also precluded the possibility of republishing the proceedings of the Medical and of the Horticultural Societies; but this had become less urgent since both of those useful bodies adopted the excellent rule of giving early publicity to their own proceedings and records.

To the Asiatic Society THE JOURNAL has naturally looked for its most frequent and interesting communications; and in consequence of its more intimate connection with that Institution, the proceedings of that body have been given in greater detail than heretofore, so that absent members may learn exactly what passes at its meetings, and what accessions are made from time to time to its library and its museum. Many absent members have complained of the quarterly subscriptions they were heretofore called upon to pay, while they remained in ignorance of what was going forward; this source of objection is now obviated, and perhaps a still greater amendment may yet be effected for their benefit, by an arrangement that all members of the Society shall receive a copy of the Journal gratis, which will reduce their annual payments nearly one fourth.

It is unnecessary to recapitulate the contents of the present volume, or to allude in anonymous praise to those who have favored its pages with their assistance; since the authors have, in most cases, on suggestion, permitted their writings to be authenticated by the insertion of their names, as should always be the case in matters of fact, observation, and research. One illustrious name however must not be passed over without a tribute of gratitude for its valued and frequent contributions, a tribute more sincerely paid, since India has now lost the power and the claim to their continuance; she has resigned her most eminent oriental scholar to climes where his talents may find more genial appreciation, but where they cannot excite more respect or admiration, than they will ever command in the land which called forth their energies and directed their application.

The learned Societies at home will be proud to publish the continuation of the *Analyses of the Puránas*, of which the four first have appeared in these pages. Abstracts of four only were ready for the press, but translations of the remainder of the eighteen *Puránas* themselves had been completed under the superintendence of Professor Wilson, before he quitted India.

Mr. Alexander Csoma's indefatigable labour, in opening to us a first acquaintance with the literature of Tibet, will be estimated as it deserves by literary men—a contracted circle perhaps, because deep erudition and study are requisite to form critics capable of appreciating the nature and bearing of his peculiar researches upon the history, languages, and religions of other nations, both ancient and modern. All may however feel sensible of the devotion, zeal, and perseverance, which are necessary to lead a man, alone and unpaid, into a distant and wild country, to learn its language, and study its people at the fountain head. The volumes of notes which Mr. Csoma has presented to the Asiatic Society, will, it is hoped, be published in their Researches at length.

In furtherance of the desire of the Government, the greater part of Dr. Buchanan's Statistics of Dinajpúr has been printed in a detached form, as commenced by the Editor of the *GLEANINGS*; and to complete the work more speedily, two extra numbers have been issued in the course of the year. It will be remarked, that there are many plates referred to in the text: the drawings alluded to are in possession of the Honorable Court of Directors, along with the original manuscripts; it was thought better to preserve the references, in case the Hon'ble Court might hereafter be persuaded to publish them, either in a separate form, or of a size adapted to the present edition. It must not be forgotten, that it is this undertaking which gained to the *GLEANINGS* the valuable privilege of free postage through the Bengal Presidency. The Editor is happy to announce, that the same boon has, in the most liberal manner, and without any solicitation, been extended to the Presidency of Bombay and to the Government of Ceylon, by their enlightened Governors, His Excellency the Earl of CLARE, and the Right Honorable Sir R. W. HORTON, to whom his thanks are thus publicly and respectfully addressed.

To his numerous correspondents, the Editor can but proffer thanks for past, and solicitations for future, support, bidding them remember that, the scope and object of this publication embraces the literature, the manners, the geography, physical and mineral, the arts, the natural productions of Asia, the phenomena of its climate, and observations of the heavens. In the words of the illustrious founder of the Asiatic Society, “ the bounds of its investigation will be the geographical limits of Asia ; and within these limits its inquiries will be extended to whatever is performed by man or produced by nature.”

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*Dedicated, by permission, to*

LADY W. C. BENTINCK,

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A

# TREATISE

ON

## THE MUSIC OF HINDOOSTAN,

COMPRISING A DETAIL OF

## THE ANCIENT THEORY

AND

## MODERN PRACTICE.

---

THE similarity of the music of Egypt and Greece to that of this country has been traced and pointed out : harmony and melody have been compared : and time noticed. The varieties of song have been enumerated, and the character of each detailed : a brief account of the principal Musicians superadded, and the work concluded with a short alphabetical glossary of the most useful musical *Terms*.

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BY

CAPTAIN N. WILLARD,

*Commanding in the Service of H. H. the Nuwab of Banda.*

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*Price to Subscribers, Sa. Rs. 8.*



## PROSPECTUS.

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A TREATISE on the Music of Hindoostan was much wanted. The scanty information obtainable through the channels of Dr. GILCHRIST and Sir WILLIAM JONES, are neither of themselves sufficient to fill this chasm, nor do they elicit light sufficient to enable one to grope through the various obscure writings in the vernacular languages and dialects. The songs set to music by Mr. BIRD and Mr. WALKIER, are of the more modern style, and not of the ancient school; so that, instead of elucidating the theory, they lead us into confusion, when compared with the tables of Rags and Raginees given by Sir W. JONES.

The forthcoming work has been written with the view of describing in some measure, the theory and practice of the original music of Hindoostan, but chiefly to unfold the beauties of which it is susceptible. The extravagant eulogium offered to the music of ancient Greece, and the striking similarity which appeared to the author to exist between that and the subject to be treated of in this work, has led him to point them out, in the hope that, should a taste for the music of this country obtain among the professors of the science in Europe, it might perhaps conduce to the elucidation and revival of a much-desired and lost branch of knowledge, namely, the music of ancient Egypt and Greece.

For this purpose it appeared to the author, that a bare translation of any of the existing native works would not suffice. All who have been taught music are so much accustomed to the European way of explaining it, that every other must necessarily appear uncouth and preposterous. In the arrangement of this work, therefore, the European system has been adopted.

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**PREFACE.** A general view of the plan and contents of the work.

**INTRODUCTION.** Music. Its power on the human mind. That of Hindoostan. The opinion of the Natives with respect to their ancient musicians. How a knowledge of it may be acquired. Not generally liked by Europeans. Reasons assigned for this. Native opinion with regard to its lawfulness. Musical instruments. Relation of music to poetry considered. Progress of music in Hindoostan. The manner of life which should be led to ensure eminence in this science. Cause of its depravity. Date of its decline. The similarity which the music of this country seems to bear to that of Egypt and Greece. How a knowledge of the music of Hindoostan might conduce to a revival of that of those countries. Comparisons offered. Whether the natives of Greece or Hindoostan had made greater progress in music. Comparisons decide in favor of the latter.

**HINDOOSTANEE MUSIC.** What it is termed in the original. The treatises held in the greatest estimation. Native divisions what, and how many. The arrangement adopted in this work.

**OF THE GAMUT.** What it is called. The derivation of the word. The subdivisions of tones. Resemblance of these to the Greek diesis. Opinions of Dr. Burney and Mr. Moore on the enharmonic genus. Names of the seven notes. Origin of these. The gamut invented by Guido and Le Maire. Dr. Pepusch. Srooti.

**OF TIME.** The various measures used in Europe. Difference between them and those of Hindoostan. Their resemblance to the rhythm of the Greeks. Similarity between the Greek and Sungscrit languages. The Hebrew unmusical, likewise the Arabic. Melody and metre considered. Tartini's objections against metre, endeavoured to be controverted. The dignified prose in Sungscrit, and tongues derived from it. Its superiority to the Oordoo. Probable origin of the modern musical measure. Tartini's deduction of measure from the proportions of the octave and its fifth, opposed to the practice of Hindoostan. Whether the rhythmical or the musical measure possesses greater advantages. Opinion hazarded thereon. Time table. Characters for expressing time. Their varieties.

**OF HARMONY AND MELODY.** The origin of harmony in Europe. Opinions of several learned men on the subject of harmony, with that of the author. Claims of melody.

**OF ORIENTAL MELODY.** Not generally susceptible of harmony. Limited to a certain number. Its character.

**OF RAGS AND RAGINEES.** The general acceptation of the terms supposed to be incorrect. Reasons offered, why they are limited to season and time. Of the Ragmala. Absurdity of limiting tunes to seasons. Divisions of Rags and Raginees into classes. Rules for determining the names of the mixed Raginees. Table of compounded Rags. The Ragmala copiously described.

**OF MUSICAL INSTRUMENTS.** Their present state susceptible of much improvement. Their classification. Detailed description of the several instruments now in use.

**Of the various species of VOCAL COMPOSITIONS of HINDOOSTAN.** Twenty different species described.

**Of the PECULIARITIES of MANNERS and CUSTOMS in HINDOOSTAN,** to which allusions are made in their song. Its characteristic nature. Reasons assigned for several of them, which now no longer exist, and examples produced.

**Brief account of the most celebrated MUSICIANS of HINDOOSTAN.**

**GLOSSARY** of the most useful musical terms.

---

*N. B. The work will be printed on superior English paper, at the Baptist Mission Press, Calcutta.*

Subscriptions will be received by Mr. A. JEWELL, Moorghehuttah, and Messrs. THACKER and Co. St. Andrew's Library.

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## DIRECTIONS TO THE BINDER.

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The sheets of Buchanan's Statistics are to be separated from the monthly numbers. The Plates may either be bound up at the end of the volume, or in the following order :

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# ERRATA.

- Page 10 line 9 for "wool," read "wood,"  
 — 11 — 7 from bottom, for "plate 1, fig. 2," read "plate 2, fig. 1."  
 — 14 — last line, for "delomite," read "dolomite."  
 — 19 — 16 from bottom, for "3, 4, 5," read "1, 2, 3, 4."  
 — 20 — 8 from top, for "plate 1," read "plate 2."  
 — 20 — 9 for "he protracted," read "the protracted."  
 — — 11 for "BB'' B'," read "B'' B'."  
 — — 16 for "intercepts," read "intersects."

AND

In Fig 2, plate II. continue the dotted arc  $l'1a''$  to  $a'$ .

The line  $A c'$  continue to  $c$ .

- 28 — 7 from top, for "manima," read "minima."  
 — — at bottom, for "Artesien," read "Artesiau."  
 — 33 — 7 for "January," read "February."  
 — 410 — — in last column of Table II. for "2m. 58s. 8," read "0m. 58s. 8."  
 — 46 — 18 from top, after "which" insert "comma."  
 — — — "either" ditto.  
 — 47 — 2 from top, for "have," read "has."  
 — 57 — 12 for " $99\frac{1}{4} 99\frac{1}{2} 99\frac{3}{4}$ ," read " $99^1 99^2 99^3$ ."  
 — 59 — 24 and throughout the article, for "sack," read "sac."  
 — 60 — 4 "orbital," read "orbital."  
 — — 10 "interval," read "internal."  
 — — 29 "lips," read "tips."  
 — — 34 dele "by."  
 — 60 — 15 for "compressed and hard; before," read "compressed and hard before ;"  
 — — 28 for "lips," read "tips."  
 — 62 — 11 for "this Chiru," read "the Chiru."  
 — 63 — 10 for "bambdoidal," read "lambdoidal."  
 — — 14 for "malars," read "molars."  
 — 65 — 8 for " $1\frac{1}{8}$ ," read " $\frac{1}{18}$ ."  
 — 67 — 2 from bottom, after "than," read "the."  
 — 74 — 15 for "9°," read "9'."  
 — 75 — 21 dele "rufous," repeated.  
 — 79 — 17 from bottom, for "done," read "donec."  
 — 148 — — foot note, for "Rutboo," read "Kubboo."  
 — 226 1st par. 5th line for "Ekadantashtra," read "Ekadanshtra,"  
 — 226 4th „ 4th — for "Kridama," read "Srid'ama"  
 — 229 2nd „ 5th — for "Vrishapati," read "Vrihaspati."  
 — 231 — „ 3rd — for "Viswaséna" read "Viswakarma."  
 — 238 — „ after "Ganges river," insert "at Gházipur."  
 — 245 10 „ from bottom, for "it," read "the mirror."  
 — — 1st „ 7th — for "He having," read "Having."  
 — 296 line 3 for "but mostly," read "and,—"  
 — — 7 for "hydrogen. When," read "hydrogen, where."  
 — 305 — 20 for "circumference," read "diameter."  
 — — 21 for " $27\frac{1}{2}$  rupees," read " $2\frac{1}{2}$  rupees."

*Errata in Meteorological Register, for June.*

Date	Hour.	Bar.
13	Sun-rise, for	,365 read ,465
14	,,	,399 ,499
22	,,	,517 ,617

Add 0,010 to all the figures in the Barometrical column for 10½ P. M.

- 340 — 6 after "*Rhinolphus*," insert "and two species of *Vespertilio*."
- 355 — 13 for "*ακανσα*," read "*ακανστα*."
- 355 — 2 from bottom, after "*nilam*," insert "*nil maní*, (or *manik*.)"
- 356 — after "College of Fort William," insert "the word *bahrmani* is also used in the *Khawás-ul-ir*, as a variety of the *yaqút*."
- 358 — 20 dele "or a species of garnet."
- 358 — 22 for "*manik*," read *lálri*."
- 403 — 5 from bottom, for "*ΔΙΟΚΛΠ*," read "*ΔΙΟΚΛΗ*."
- 404 — 14 for *ΟΥΑ*," read "*ΟΥΑ*."
- 411 — 8 for "Latitude 25° 43'," read "Lat. 25° 47' 26'."

In Table IV. of the Estimate of Life in India, page 284, the first four figures in the second and third column should stand thus :

Age.	Survivors.	Deaths.
20	52221	473
21	51748	489
22	51259	522
23	50737	557

The mistake arose from the calculations having originally been made to commence with the age of nineteen, instead of twenty: and the 5 year averages in Table III. page 283, will all be slightly affected by the same cause. The last figure in the second column, page 284, should be reversed; and in the last column but one, for "2080," read "2008."

- Line 414 line 3 from below, for "*molluscæ*," read "*mollusca*."
- 444 — 36 after "ministry," insert "of a man."
- 445 — 3 from below, for "2125," read "212.5."
- 446 — 7 for "in bullion," read "bullion."
- 447 — 21 for "will be," read "would be."
- — — after "at any," insert "rate."
- 480 — 15-16 for "*Tariqa-i-Chishita*," read "*Tariqa-i-Chishtia*."
- 483 — 36 for "lost about," read "tost about."
- — — 39 for "*Mújtahid-i-mústaquill*," read "*Mújtahid-i-mústaquill*."
- 485 — 20 for "*Taqwiat-ul-Imám*," read *Taqwiat-ul-Imán*."
- 487 — 15 erase "5" at beginning of line.
- 488 — 7 for "differences," read "difference."
- 489 — 20 for "*Káfr*," read "*Kufr*."
- 491 — 23-24 for *Ishrák f'il Tasarruf*," read "*Ishrák f'il Tasarruf*."
- 492 — 10-11 for "the authority or influence of Saints, as respecting intercessors," read "respecting the authority or influence of Saints as intercessors."
- 498 — 23 for "*Khátim*," read "*Khátima*."
- 501 — 12 after "A B C," insert "[fig. 5.]"
- 505 — 20 for "5 53 59," read "5 52 59."
- 506 — 11 — "5 53 10," read "5 53 27."





# JOURNAL

OF

## THE ASIATIC SOCIETY.

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*No. 7.—July, 1832.*

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I.—*Translation of a Tibetan Fragment, by Mr. Csoma de Kőrös, with remarks by H. H. Wilson, Secy.*

(Read, July 4th.)

In the 9th volume of the Gyut class of the Kalgyur occurs the original of a Tibetan fragment, which created in the beginning of the last century a lively sensation amongst the learned men of Europe, and the history of which furnishes an amusing instance of the vanity of literary pretensions, and of the patience and pain with which men of talent and erudition have imposed upon themselves and upon the world.

In the end of the 17th and beginning of the 18th century, the Russians in their incursions into Siberia came upon various deserted temples and monasteries, in some of which considerable collections of books were deposited. These were in general destroyed or mutilated by the ignorant rapacity of the soldiery, but fragments of them were preserved, and found their way as curiosities to Europe.

Amongst these, some loose leaves, supposed to have been obtained at the ruins of Ablakit, a monastery near the source of the Irtysh, were presented to the emperor Peter the Great. Literature being then at a low ebb in Russia, no attempt was made to decypher these fragments, and they were sent by the Czar to the French Academy, whose sittings he had attended when at Paris, and who deservedly enjoyed the reputation of being the most learned body in Europe. In 1723, the Abbé de Bignon, on the part of the Academy, communicated to the Czar the result of their labour, apprising him, that the fragments sent were portions of a work in the Tibetan language, and sending a translation of one page made by the Abbé Fourmont with the help of a Latin

and Tibetan Dictionary in the Royal Library. The letter was published in the Transactions of the Academy of St. Petersburg, and the text and translation reprinted by Bayer in his *Museum Sinicum*. Müller in his *Commentatio de Scriptis Tanguticis in Siberiâ repertis*—Petropoli, 1747, criticised Fourmont's translation, and gave a new one of the first lines, prepared with the double aid of a Tangutan priest, or Gelong, who rendered it into Mongol, and a Mongol student of the Imperial College, who interpreted that version to Müller. The original was also engraved in the Transactions of the Leipsic Academy. It was reprinted with corrections and additions and a new translation by Giorgi in his *Alphabetum Tibetanum*, and has recently been made the subject of animadversion by Mons. Remusat, in his *Recherches sur les Langues Tartares*. Of the previous performances, M. Remusat thus speaks : " On avoit d'abord admiré la profonde erudition qui avoit permis à Fourmont de reconnoître seulement la langue dans laquelle le volume étoit écrit : on a vanté depuis celle de Giorgi, qui avoit rectifié et le texte et la traduction. Je ne sais comment on peut traduire ou corriger un texte qu'on n'est pas même capable de lire. Il n'y avoit rien d'admirer dans tout cela : interprètes et commentateurs, panegyristes et critiques tous étoient presque également hors d'état, je ne dis pas d'entendre une ligne, mais d'épeler une syllabe du passage sur lequel ils disertoient.

The consequence was what might have been expected, and the attempts at translation and correction were most ludicrously erroneous. The greatest liberties possible were taken with the words, and letters were inserted or omitted at pleasure, in order to make them approximate to those terms which appeared most like them in the imperfect dictionaries possessed by the translators. After all, the translation was not only unlike the original, but unlike common sense ; and as was remarked of Fourmont's version by the President de Brosses, the Latin was quite as unintelligible as the Tangutan. The following specimens of the first lines of the different versions will show that the remark was applicable to all as well as to the first.

*Fourmont's Translation.*

" Attribitâ fortitudine quisnam brevis equus frigoris vita destruat (pro) spiritu inest putredo. Contritus oratne ? hoc est irrissio omnes vident : orat avis contrita ? morbida ? non scit (non potest amplius) os aperire legis (ratiocinationis)."

This must have puzzled the Czar and his academy quite as much as the original ; and as Remusat observes, the Latin was of marvellous use to the translator. Fourmont would not have dared to write a syllable of such nonsense in French.

The manner in which Fourmont was led to such a strange misrepresentation of the original is explained by Mons. Remusat, from whom we may take one instance as a specimen—Thus of the word *brevis equus*. The MS., M. Remusat says, was read by Fourmont *Tsru pá té*, (Mr. Csoma has *ch'hud-pá-des*.) He found in the Dictionary *chung-pá* signifying 'short' and *r-ta* meaning 'a horse', and these being the nearest approach to the syllables before him, he adopted as essentially the same, and rendered them accordingly.

*Müller's Translation.*

"Firma conscientiâ mediante omnia parvi pendendo in principio vivente cuicumque auxilium oritur inde. Quibus consummatis futurum quid nemini notum est. Religio tota namque religionis explicatio. Magnates autem intellectu (suo) ea non comprehendunt."

The matter has not been made much more distinct by the aid of the Tangutan monk and Mongolian student.

*Giorgi's Translation.*

"Misericordia recreat et a cruciatibus absolvit Summus protector viventes omnes qui eam adoratoribus suis revelat. Benefici largitoris virtutem sciunt omnes, sed orationis invocationisque vim et efficaciam exponere et aperire nesciunt: non enim ea exprimit arcanum illius legis quæ lex est spirituum, &c."

How far either of these expresses the sense of the opening of this fragment, may now be duly appreciated by the perusal of the following.

*Mr. Csoma's Translation.*

[*Chomdan dás*] "addressed his mind to meditation upon the affairs of animate existences. The ignorant do not perceive the moral signification of moral things."

Not a word of this appears in the preceding versions. Its accuracy speaks for itself; but in confirmation of its correctness, the original Tibetan, both in Tibetan and Roman characters, is here reprinted, as well as the translation of the entire passage. Those to whom the prosecution of the subject is of interest may readily estimate for themselves the superiority of Mr. Csoma's labours, by comparing them at length with the text and translations of Fourmont and Giorgi in the *Alphabetum Tibetanum*.

Before proceeding to the new translation, however, a few further remarks upon the subject of the old are necessary.

The Society is apprised of the general character of the contents of the Gyut portion of the *Kahgyur*, to which our original belongs, and will not be surprised, therefore, to learn that a great part of the extract consists of Mantras, or mystical formulæ, or invocations, and these not



in Tibetan but in Sanscrit. Now, neither of the former translators had any knowledge of Sanscrit, nor was aware that these passages were in that language. Fourmont considered them to be Tibetan, as well as the rest, and very deliberately translated the Sanscrit words with the help of his Tibetan Dictionary. As he could not find the exact words; however, he was content to take those most like them; and at the expence of a few letters omitted or inserted, he contrived equivalents for the *mantras* equally satisfactory with those he had devised for the other sentences of his text. Thus he converts the Mantra *Nama Sámanta Buddhánam, Sámantanugate, varaja, Dharmannirgata, Mahá Mahá Swáhá*, into *Na-ma Sam-tam Pou-tra Nan-hi-tsí cha-ya r-pa sa-n-ha*, which he translates, “Ægrotavit (restitit morbo) Samtam pou-tra per annum dum hujus mundi evanesceret, &c.” The same importing, as far as such things admit of being translated, “Salutation to the chief *Buddhas*. Obtainer of pre-eminence; best born; who proceeded from virtue. Great great adoration.”

Giorgi is more upon his guard, and discovers that the *mantras* are not in ordinary Tibetan. He has no suspicion however of their real character, and calls them magical expressions. He prints them therefore without any translation, but nevertheless pretends to explain their purpose in his notes on the text, in which he assembles a crude mass of extravagancies from Hebrew, Chaldaic, Coptic, and Syriac, and compares these Tibetan characters to the mystic numbers and letters of the ancient Scythians and Egyptians, and of some of the early Sectarians and Heretics of the Christian Church. This display of unprofitable erudition is in fact only a shelter for his ignorance, and he knows no more about the matter than did Fourmont, without having the merit of his blundering simplicity.

We shall now proceed to the translation.

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*Translation of an Extract from the T. or 9th. volume r, Gyut class of the Káh-gyur, the 337—339 leaves.*

Ignorant men do not know that all these (doctrines) have been thus explained by *Chom dan dás* (the Supreme), the knower of all and possessor of all, who in remote ages, through compassion for all living beings, addressed his mind to meditation upon the affairs of animate existences. (a Stanza) The ignorant do not perceive the moral signification of moral things. It has been distinctly taught (by *Buddha*), that the essential principle of morality is the non-entity of matter.

The performer of mystic rites must always dwell upon that idea, and discharge his duty accordingly.



This was a gradual and comprehensive explanation of the means by which noxious things (or evil spirits) may be appeased.

Then CHAKNA DORJE (S. VAJRAPÁNI) and other *Dor,je* bearers, (*Vajradharas*, bearers of thunderbolts), KUNTU-ZANGPO (SÁMANTA BHADRA), and other *Chang chub sempás* (Bodhisatwas) having adored *Chom dán das*, NAM PAR-SNANG-DSAT (the Bhagaván or Lord VAIROCHANA), being desirous to express each in his own *mantra* or invocation, his mystic praise, and how they judged in this great circle the source of infinite mercy, of the pure way of access to the root of all things, requested permission from CHOM DAN DAS.

Then CHOM DAN DAS having granted them permission, and bestowed his benediction upon them, thus spake, “Illustrious children, accordingly as you judge of the root of things (the first moral being), utter your mystic sentences for the purification of all animate existence.”

Then the Bodhisatwa KUNTU ZANGPO, being immersed in that profound meditation, which is called the region of the ornamental (characteristic) of a Buddha, uttered this mystical sentence (*mantra*) of irresistible efficacy.

Nama Sámanta Buddhánam, &c. Glory to the exalted Buddhas ! obtainer of eminence ; best born ; who proceedest from virtue—great, great adoration. This is the *mantra* of KUNTU ZANGPO.

[For the rest of this, and for the Sanscrit of the other Mantras, see the passages in *Italics* in the Tibetan extract in Roman character.]

Then the Bodhisatwa CHAMPA (MAITREYA) after being immersed in the profound meditation called “the universally manifested beneficence,” thus uttered his own radical prayer (*vija mantra*), *Nama Sámanta Buddhánám*, &c. Glory to the exalted Buddhas ; conqueror of the invincible ; possessor of the fame of all purity—adoration. This is the prayer of CHAMPA.

Then the Bodhisatwa NAM-KHE NYING PO (ÁKÁSA GERBHA) being immersed in the profound meditation called “the purest region,” uttered through mystery, Glory to all the Buddhas ; wonderful holder of blessings ; who art possessed of equal elevation with the heavens—salutation. This is the prayer of NAM-KHE NYING PO.

Then the Bodhisatwa GRIPPA THAM CHET NAM-PAR SELVA (S. Sarva Anavarana Vishkambhi) being immersed in the meditation, called “the power of great mercy,” uttered his mystery, Glory to the exalted Buddhas ; thou who art not separated ; connected with the Aswattha tree. *Trám Trám, Rám Ram*—salutation.

[This is one of the Mantras, of which there is no making any sense ; some allusion is implied probably, a knowledge of which is necessary to explain the words. The concluding syllables are merely ejaculatory monosyllables.]

Then the Bodhisatwa KUNTU CHENRESIK VANGCHUK (S. AVALOKITESWARA) being immersed in the meditation called (after him) KUNTU CHENRESIK, or “looking every where with clear vision,” thus together with his followers uttered his own radical mystery, Glory to the exalted Buddhas: universal *Tathágata*, AVALOKITA; abounding with clemency—Ra-ra-ra-hum-jah—salutation. This is the mantra of CHENRESIK.

Glory to the exalted Buddhas, Jang-jang sa,—salutation. This is the mantra of TIJU-CH HEN T’HOP (S. MAHA St HANA PRÁPTA).

Glory to the exalted Buddhas; offspring of clemency, TÁRÁ, by whom existence is traversed—salutation. This is the Mantra of the LHAMO GROL MA, (the goddess TÁRÁ.)

Glory to the exalted Buddhas: frightener of every fear. Hum, Sphotaya—salutation. This is the mantra of Kronyer Chen Má (S. Bhrikuti.)

Glory to the exalted Buddhas: born from all the *Tathágatas*; decorated with a chaplet of Lotus flowers—salutation. This is the Mantra of Kos Kar Chen (S. PÁNDURA VÁSINÍ), the goddess clothed in white garments.

Glory to the exalted Buddhas: Hum-Eat-bind-*Sphotaya*. This is the Mantra of a *Ta-grin*. (S. *Kinnara*).

Then the Bodhisatwa SAHI NYING po (S. KSHITI GERBHA) being immersed in the meditation called “the region of reasoning,” uttered this mystery, Glory to the exalted Buddhas, Ha ha-ha Putanu—salutation. This is the mantra of SAHI NYING PO.

Then the Bodhisatwa JAM-PAL ZHON NUR GYURZH PA (S. Manju Sri KUMARA BHATTA BHUTA) being immersed in the deep meditation called “the miraculous transformation by the blessings of Buddha,” thus uttered his own radical mystery, Glory to the exalted Buddhas. He-he-he, the young prince, Liberation. Communion.—Remember, remember, resist. Swaha. This is the Mantra of Jam-pal.

Then CHAKNA DORJE (S. VAJRAPÁNI), the lord of those who deal with mysteries, being immersed in the deep meditation called “the invincible,” thus uttered together with his followers his own radical mystery, Glory to the exalted *Vajras*, fierce and greatly wrathful. Hum. This is the mantra of CHAKNA DORJE.

(Similar mantras by the goddess MÁMAKÍ and five others follow, occupying three lines).

Then the Lord SAKYA THUP-PA (MUNI) being immersed in the deep meditation called “the mine of precious things,” thus with his attendants uttered his own mystery, Glory to the exalted Buddhas; reliever

of all distress ; master of all virtue. Equal, equal to the heavens—salutation. This is the Mantra of SAKYA THUP-PA).

(Similar mantras are continued through the following page of the same leaf.)

### The Tibetan Text in Roman Character.

NOTE.—The letters in italics at the commencement of any syllable, are omitted in the pronunciation. The Sanskrit passages or *mantras* are printed in italics.

Mi *blun* po dé dag gis *hdi* ltar *bchom-lan-hdas* thams chad mkhyen pa chhos thams chad la *mñ* ah *brn* yes pa Sems chan gyi don thogs “\*par thugs su chhud pa dës sñon sems chan *rnams* la phan par Bzhed nas *hdi* dag thams chad bshad do zhes bya var ni mishes so.

Chhos *rnams* kyi ni chhos kyi *mts’han* *blun* po dës ni dé mi shes ; Chhos *rnams* kun gyi *mts’han* nyid ni, stong pa nyid du yang dag gsungs sñags pa rtag tu der gnas nas, rab tu ñes par las byaho. Bgegs zhi var bya va rim par phyé vá sté rgyas paho.

Dé-nas phyag na rdo rjé la sogs pa rdo rjé *hdsin* pa dé dag dang Kun tu bzang po la sogs pa byang chhub sems *Dpah* di *rnams* kyis *bchom-lan-hdas* *rnam-par-s nang-mdsad* la phyag *hts’hal* nas snying rjé chhen po hbyung vahi *dkyil* hkhör chhen po *hdir* chhos kyi *dvyings* *rnam* par dag pahi *Sgo* ji ltar rtogs pa rang rang gi ts’hig tu brjod pahi ts’hig gis gsang sñags *rnams* smra var *hdod* nas *bchom-lan-hdas* la gsol va btab po dé nas *bchom-lan-hdas* *rnam* par snang mdsad kyis byang chhub sems *dpah* dé dag dang rdo rjé *hdsin* dé dag la mi nyams pahi chhos nyid du byin gyis *brlabs* nas *bkah* stsal pa : Rigs kyi bu dag chhos kyi vyings ji ltar rtogs pa bzhin sems chan gyi kham *rnam* par sbyang vahi gsang sñags kyi ts’hig *rnams* smros-shig.

Dé-nas dé-hí ts’hé byang chhub sems *Dpah* Kun tu bzang pos sangs rgyas kyi yul zhes bya vahi ting gé *hds’in* la snyoms par zhugs nas Stobs thogs pa med pahi gsang sñags smras pa : *Namah Samanta Buddhánám ; Samantánugati Varaja, Dhermanirgata, Mahá Mahá. Swáhá.* Kun tu bzang po hiho.

Dé-nas byang chhub sems *dpah* byams pas byamspa chhen po kun tu mñon par hbyung va zhes bya vahi ting gé *hdsin* la snyoms par zhugs nas rang gi snying po smras pa : *Namah Samanta Buddhánám, Ajitanajaya, Sarvva Satwayashayanugata, Swáhá.* Byams pahi ho.

Dé-nas byang chhub sems *dpah* nam mkhahi snying po *rnam* par dag pahi yul zhes-bya vahi ting gé *hdsin* la snyoms par zhugs nas gsang sñags smras pa : *Namah Samanta Buddhánám, A’kásha somatánugata Vichittram Varadhara, Swáhá.* Nam mkhahi snying pahi ho.

\* The Tibetan fragment of Giorgi commences here.

Dé-nas byang-chhub sems dpah sgrib pa thams chad rnam par sel va Snying rjé chhen pohi Stobs zhes bya vahi ting gé hdsin la snyoms par zhugs- nas g,sang sñags smras pa : *Nama Samanta Buddhánám, A'swáata hríta, Avyudgata, Trám Trám, Ram, Ram, Swáhá.* Sgrib ba thams chad rnampar sel vahi ho.

Dé nas byang chhiub sems dpah kun tu spyen ras gzigs dvang phyug spyen ras gzigs zhes bya vahi ting gi hdsin-la snyoms par zhugs nas rang gi snying po hkhordang bhas par smras pa : *Namah Samanta Buddhánám, Sarva Tathágata, Avalokita, Karaná, Mayá, Ra Ra Ra, Hum jah, Swáha.* Spyen ras gzigs dvang phyug gi ho.

*Namah Samanta Buddhánám, jang jangsa, Swáhá.* Mthu-chhen-thob pahi ho.

*Namah Samanta Buddhánám, Karnnodbhavé Tári Taráni, Swáhá.* Lá mo sgrol ma hi ho.

*Namah Samanta Buddhánám, Sarva Bhaya Trásaái Hum spho'taya, swáhá.* Khro G,nyer chan mahi ho.

*Namah Samanta Buddhánám, Tathágata Vishvayá, Sambavé, Padma málini, Swáhá.*

Gos dkar-chan gyi-ho. *Namah Samanta Buddhánám, Hum khada bandha spho'taya, Swáhá.* RTa Ngrin gyi ho.

Dé-nas byang chhub sems dpah-sahi snying po rdo rje mi shigs pa r,tog pahi yul zhes bya vahi ting gé hdsin las snyoms par shugs nas gsang sñags smras pa : *Namah Samanta Buddhánám Ha Ha Ha, Putánu, Swáhá.* Sahi snying pahi ho.

Dé-nas byang chhub sems Dpah hjam dpal gzhon nur gyur pas sangs rgyas kyi byin gyis brlabs rnam par hphrul pa zhes bya vahi ting gé hdsin la snyoms par zhugs nas rang gi snying po smras-pa : *Namah Samanta Buddhánám, Hé Hé Hé, Kumaraka, Vimukti, Sathérthati, S mara smara, Prathihana, Swáhá.* Hjam dpal gyi ho.

Dé nas gsang va pahi bdag po Phyag na rdo rjé mi hpham pazhes bya vahi ting gé hdsin la snyoms par zhugs nas rang gi snying po hkhordang bhas pa smras pa : *Namah Samanta Vaj'ránám, Chándá Máhá\** Ros'hana Hum. Phyakna rdo rjéhi ho.

\* \* \* \*

Dé-nas déhi ts'hé. Chom-ldan-hdas Shákya Thub pas rin po chhehi hbyung gnas zhes bya vahi ting gé hdsin la snyoms par zhugs nas nyid kyí snying po hkhordang bhas pa gsungs pa : *Namah Samanta Buddhánám, Sarva klésha nishuddhána, Sarva Dherma vahi prapta, Gagana sama sama, swáhá.* Shákya Thub pahi ho.

\* Giorgi's fragment ends here in the middle of the word *mahá*, the remaining passage is added to complete the sense.



མི་སྤྱོད་པོ་དེ་དག་གིས་འདི་ལྟར་བཅོམ་ལྟོན་འདས་ཐམས་ཅད་  
 མཆོག་པ། ཆོས་ཐམས་ཅད་ལ་མངའ་བརྟེན་པ། སེམས་ཅན་གྱི་དོན་  
 རྟགས་"པར་བྱགས་སུ་རྒྱུད་པ་དེས་སྟོན་སེམས་ཅན་རྣམས་ལ་  
 མཁུ་པར་བཞེད་ནས་འདི་དག་ཐམས་ཅད་བཞད་དོན་གྱིས་ཏུ་  
 བར་ཁྱིམ་གྱིས་སོ། ། ཆོས་རྣམས་ཀྱི་ནི་ཆོས་ཀྱི་མཆོག་། ། ལྷོན་པོ་  
 དེས་ནི་དེ་མི་གྱིས་། ། ཆོས་རྣམས་ཀྱུ་བ་ཀྱི་མཆོག་ཉིད་ནི། ། ལྟོད་  
 པ་ཉིད་ཏུ་ཡང་དག་གསུངས་། ། ལྟོན་པ་རྟག་ཏུ་དེར་གནས་  
 བས་། ། རབ་ཏུ་དེས་པར་ལས་ཏུ་མོ། ། བཞག་གས་ནི་བར་ཏུ་བ་  
 རིམ་པར་སྟེ་བ་སྟེ་རྒྱས་པར་མོ། ། དེ་ནས་ལྟག་ན་དོན་རྩི་ལས་གས་  
 པ་དོན་རྩི་འཛིན་པ་དེ་དག་དང་ཀྱུ་བ་ཏུ་བཟད་པོ་ལས་གས་པ་ཏུ་  
 རྒྱལ་སེམས་དཔའ་དེ་རྣམས་ཀྱིས་བཅོམ་ལྟོན་འདས་རྣམས་  
 པར་སྤྱད་མཛད་ལ་ལྟག་འཛིན་གས་། ལྟོད་རྩི་ཆེན་པོ་འཇུག་  
 བའི་དཀྱིལ་འཁོར་ཆེན་པོ་འདིར་ཆོས་ཀྱི་དཀྱིལ་རྣམས་པར་  
 དག་པའི་སྟེ་རྩི་ལྟར་རྟགས་པ་འདྲའང་གི་ཆེན་ཏུ་བརྩེད་པའི་ཆེན་  
 གསེ་གས་སུ་གས་རྣམས་སྟེ་བར་འདོད་ནས་བཅོམ་ལྟོན་འདས་  
 ལ་གསལ་བ་བཟབ་པོ། ། དེ་ནས་བཅོམ་ལྟོན་འདས་རྣམས་  
 པར་སྤྱད་མཛད་ཀྱིས་ཏུ་རྒྱལ་སེམས་དཔའ་དེ་དག་དང་།  
 དོན་རྩི་འཛིན་དེ་དག་ལ་མི་རྣམས་པའི་ཆོས་ཉིད་ཏུ་ཀྱུ་བ་ཀྱིས་  
 བཟུགས་ནས་བཞད་སྟེ་ལ་པ། ། རྟགས་ཀྱི་སྤྱོད་དག་ཆོས་ཀྱི་



དཔྱད་པ་འི་ལྟར་རྟོགས་པ་བཞིའི་སེམས་ཅན་གྱི་ཁྲིམས་ལྟར་པར་  
 སྤྱོད་བའི་གསང་སྒྲགས་ཀྱི་མཁོ་རྣམས་སྤྱོད་ཤིག །དེ་ནས་དེ་འོ་ཆོ་  
 བྱང་ཆུབ་སེམས་དཔའ་ཀྱུན་ཏུ་བཟད་པོས་སངས་རྒྱུ་ཀྱི་ཆུབ་  
 ཀྱི་ཡུལ་ནས་ཕྱི་བའི་ཏིང་ངེ་འཛིན་ལ་སྤྱོད་པ་པར་ལྷགས་ནས་  
 སྤྱོད་པ་ཐོགས་པ་མེད་བའི་གསང་སྒྲགས་སྤྱོད་པ་ལ། བ་མཆོས་མཐུ་  
 བྱང་རྩ་བུ། ས་མཐུ་ལྷན་གྱི་བ་ར་ཇི་རྩ་བུ་འཛིན་ཏུ་མ་རྩ་བུ་  
 སྤྱོད་ཏུ། །ཀྱུན་ཏུ་བཟད་པོས་འོ། །དེ་ནས་བྱང་ཆུབ་སེམས་  
 དཔའ་བྱམས་པས་བྱམས་པ་ཆེན་པོ་ཀྱུན་ཏུ་མཛོལ་པར་  
 འཕྱང་བ་ནས་ཕྱི་བའི་ཏིང་ངེ་འཛིན་ལ་སྤྱོད་པ་པར་ལྷགས་ནས་  
 རང་གི་སྤྱོད་པོ་སྤྱོད་པ་ལ། བ་མཆོས་མཐུ་བྱང་རྩ་བུ། ཡ་ཇི་ཏུ་  
 བ་ཇི་ཡ། སརྩ་ས་ཏུ་ཡ་ལ་ཡུ་བུ་ག་ཏུ་སྤྱོད་ཏུ། བྱམས་པ་འོ་  
 འོ། དེ་ནས་བྱང་ཆུབ་སེམས་དཔའ་ནམ་མཁའི་སྤྱོད་པོ་  
 ལྟམ་པར་དག་པའི་ཡུལ་ནས་ཕྱི་བའི་ཏིང་ངེ་འཛིན་ལ་  
 སྤྱོད་པ་པར་ལྷགས་ནས་གསང་སྒྲགས་སྤྱོད་པ་ལ། བ་  
 མཆོས་མཐུ་བྱང་རྩ་བུ། ཡུ་ཀྱ་ལ་ས་མ་རྩ་བུ་ག་ཏུ་  
 བོ་ཅི་ཏུ་བ་ར་རྩ་བུ་སྤྱོད་ཏུ། ལྟམ་མཁའི་སྤྱོད་པོ་འོ། །དེ་  
 ལྟམ་བྱང་ཆུབ་སེམས་དཔའ་སྤྱོད་པ་ཐོགས་ཅད་རྣམ་  
 པར་སེལ་པ། སྤྱོད་ཇི་ཆེན་པོས་སྤྱོད་པ་ལྷན་གྱི་བའི་  
 ཏིང་ངེ་འཛིན་ལ་སྤྱོད་པ་པར་ལྷགས་ནས་གསང་སྒྲགས་





ལྷ་ས་པ། བ་མེད་ས་མཁུ་བུད་རྩུ་བུ། ལྷ་སྐྱད་རྩུ་རྩུ། ལྷ་བུད་  
 ག་རྩུ། རྩུ་རྩུ་རྩུ་རྩུ་སྐྱ་རྩུ། ལྷ་སྐྱ་པ་ཕྱམས་ཅད་རྩུ་མ་པར་སེལ་  
 བའི་འོ། ། དེ་ནས་ཕྱད་ཆུབ་སེམས་དཔའ་ཀྱུ་བ་རྩུ་སྐྱ་རྩུ་  
 ག་ཅིག་ས་དབང་ལྷ་ག་ཀྱུ་བ་རྩུ་སྐྱ་རྩུ་ག་ཅིག་ས་ཞེས་ཕྱ་  
 བ་རྩུ་དེ་འཇོ་ལ་སྐྱམས་པར་ཞུགས་ནས་རང་གི་སྐྱེ་པོ་  
 འཁོར་དང་བཅས་པར་སྐྱ་ས་པ། བ་མེད་ས་མཁུ་བུད་རྩུ་བུ།  
 ། ལྷ་སྐྱ་རྩུ་ག་རྩུ་ལ་པ་ལོ་ཀི་རྩུ། ཀྱ་རྩུ་རྩུ་ལྷ་རྩུ་རྩུ་  
 རྩུ་སྐྱ་རྩུ། ལྷ་སྐྱ་རྩུ་ག་ཅིག་ས་དབང་ལྷ་ག་ཅི་འོ། ། བ་མེད་ས་མཁུ་  
 བུད་རྩུ་བུ། རྩུ་རྩུ་ས་སྐྱ་རྩུ། ལྷ་སྐྱ་ཆེན་ཕོ་པ་པའི་འོ། ། བ་མེད་ས་  
 མཁུ་བུད་རྩུ་བུ། ཀྱ་རྩུ་འོད་རྩུ་པོ་རྩུ་རྩུ་རྩུ་འོ་སྐྱ་རྩུ། ལྷ་མོ་  
 ལྷ་མཁུ་པའི་འོ། ། བ་མེད་ས་མཁུ་བུད་རྩུ་བུ། ལྷ་སྐྱ་པ་ལ། རྩུ་ས་  
 བོ་རྩུ་སྐྱ་ལ་ལ་སྐྱ་རྩུ། ལྷ་ག་ཅི་རྩུ་ཅན་པའི་འོ། ། བ་མེད་ས་མཁུ་  
 བུད་རྩུ་བུ། རྩུ་སྐྱ་ག་རྩུ་པོ་ལྷ་ལ། སྐྱ་པོ་པ་པ་ལྷ་ལོ་བོ་  
 ལྷ་རྩུ། ལྷ་ས་དཀར་ཅན་ཅི་འོ། ། བ་མེད་ས་མཁུ་བུད་རྩུ་  
 བུ། རྩུ་ལ་ད་པ་རྩུ་སྐྱ་ལ་ལ་སྐྱ་རྩུ། རྩུ་མཁུ་པོ་ཅི་འོ། ། དེ་  
 བས་ཕྱད་ཆུབ་སེམས་དཔའ་སེམས་པོ་རྩུ་པོ་རྩུ་མི་ཞེས་  
 པ། རྩུ་ག་པའི་ལྷ་མ་ཞེས་ཕྱ་པའི་རྩུ་དེ་འཇོ་ལ་སྐྱམས་པར་  
 ཞུགས་ནས། གསང་སྐྱ་གསང་སྐྱ་ས་པ། བ་མེད་ས་མཁུ་བུད་  
 རྩུ་བུ། རྩུ་རྩུ་རྩུ་རྩུ་སྐྱ་རྩུ། ལའི་སྐྱེ་པོ་པའི་འོ། ། དེ་



[illegible]

དེ་ནས་དེ་མི་ཚེ་བཙེམ་ལྟན་འདས་ལྟུ་ཐུབ་པས་འཛི་པ་  
 ཚེ་འུ་ཐུང་གནས་ལས་ཏུ་བའི་ཏིང་ངེ་འཇུག་ལ་སྟོམས་  
 བར་བྱས་ནས་འདི་ལྟེ་སྟོང་པ་འཁོར་དང་བཙས་པ་  
 བསྐྱེད་པ་ཁ་མེད་ལ་མཁུ་ཐུང་རྟུ་རྟུ། སུ་གྲོ་གྲོ་གྲོ་ལྟུ་རྟུ་  
 ར། སུ་རྟུ་མ་བ་ཤི་རྟུ་ལ་ག་ལ་མ་ས་མ་ས་མ་སྟུ་རྟུ། ལྟུ་  
 ཐུབ་པའི་འོ།



II.—*Estimate of the Risk of Life to Civil Servants of the Bengal Presidency in each year of their Residence in India. By H. T. Prinsep, Esq. Secretary to Government, &c. &c.*

The Number of the GLEANINGS in SCIENCE for September, 1831, contained an article “On the Duration of Life in the Bengal Civil Service” with several tables, exhibiting the results at which the author had arrived by various processes of calculation. The subject is of first-rate interest to all residents in India, and the manner in which these tables have been given forth is likely to lead to their being taken upon trust as of full authority. The results however are too startling to be admitted without a strict examination of the data, which are the basis of calculation; and as the registers and statements from which these profess to be taken were compiled principally in my office, and have recently been brought to more accuracy than they possessed when first prepared and furnished to the Finance Committee, and to other departments and public officers, I have thought it my duty to recast them myself into a tabular form, so as to allow the results afforded by them to be compared with those assumed in the article in question. I am sorry to say, that they differ too widely to be adjusted by any compendious explanation of discrepancies; and, as I have found reason moreover to doubt whether any accurate conclusions can be drawn from the specific results which are there exhibited as the basis of calculation, I am compelled to adopt somewhat different forms. For these reasons, no less than for assurance, that the data have not been lightly assumed, my first table has extended to a size and contains a quantity of detail which may prove inconvenient.

It is necessary to premise that the materials we possess are: first, the appointments made in each year by the Honorable Court of Directors. Secondly, the arrivals in India under these appointments; which are necessarily irregular in date, and not equal in number with the nominations. Thirdly, the retirements; which is rather a wide class, including as well those who absolutely resign, as those who leave the country upon temporary leave, and overstay the period of five years fixed by Act of Parliament as the limit for absence from India without loss of the service. Civil Servants on Furlough, or in Europe, under temporary leave, being still borne on the registers, and their deaths being reported, are considered as still in the service, and though dying perhaps in Europe or on shipboard would be entered amongst the deaths. The dismissals from service are included in the head of Retirements. Fourthly, Deaths; the reports of which, with the dates, are ordinarily on record;

or, if not so, the time can be ascertained with sufficient accuracy by a reference to the books of the General Treasury, which show up to what date salary has been drawn and arrears adjusted with executors. Deaths on shipboard, when not reported, are considered as of the year in which the ship left India.

From the above materials, the Court's annual list of appointments being taken as a ground-work, every individual name has been traced, and the fate of the person who bore it, ascertained to the time of his death, or of his quitting the service. The following statement exhibits the result in one view with the date by the calendar year of each death or retirement. If any one should desire to know the names of the individuals represented by the figures of this table, that information also is at his service in the registers that have been compiled, together with the specific ground of placing in each instance. Our present business however is with the results in abstract.

This table corresponds with that of page 273 in the article of the GLEANINGS referred to, only so far as that the number of appointments between 1790 and 1828 will be found to be the same. The number here is 842, to which add 11 for those who never came to India under their appointments, as noted at the foot of the table. The writer of the article assumes 852\*, showing that he has followed the same registers without rejecting the non-arrivals, which, for the correct ascertainment of the proportion of deaths, should evidently have been done. The table requires to be well studied and examined, before we proceed to make deductions from the data it contains. The test or verification of its accuracy will be found in the last column, which gives the remaining servants of each year, that is, those still in the service, after deducting the deaths and retirements, up to the date of compilation, from the number of original appointments. See Table No. I.

Now, the first thing to be remarked in this table is, that the appointments being taken from the date of the dispatch of the Court of Directors, which date is not invariably the 31st December or 1st January, the period comprised in the year of appointment is not a complete year. Of the 19 men appointed in 1790, 15 only arrived in India in that year; the remainder came in 1791. But whether they arrived or not would not very much signify, if we had their life to reckon for a complete year. The material circumstance is, that the appointments were made at different dates, mostly, indeed, in the first half of the year before May; but one gentleman (Mr. Leicester) was appointed in December, 1790, and yet reckons high on the list of the year. For this last reason, added to the difficulty created by the non-arrivals, it has been deemed

\* This number is one short of the true, because there were two Robert Grahams appointed in the same year, and they were supposed to be the same person.



*The figures towards the right hand of each column denote Deaths: those on the left hand, Retirements.*

Ital. 940

\* We have been compelled to omit the surviving residents of each into the space allowed. The omission is immaterial, as the same number of deaths and retirements in juxtaposition in the same column, but as the numbers are in every case units, there can be no difficulty in distinguish-



TABLE II.

Survivors of each year of service, commencing with the 1st Jan. following the date of nomination.

Years.	Nomina- tions.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
1831	29																																											
1830	25	25																																										
1829	44	44	44																																									
1828	41	41	41	40																																								
1827	50	49	47	46	46																																							
1826	33	32	32	30	29	28																																						
1825	20	20	19	19	19	19	19																																					
1824	20	20	20	20	18	18	17	17																																				
1823	13	13	12	11	11	11	10	10	10																																			
1822	13	13	12	11	11	11	11	11	11	11																																		
1821	17	17	17	17	16	16	16	16	16	16	14																																	
1820	17	17	15	15	13	13	13	12	12	12	12	11																																
1819	19	19	19	19	19	19	18	18	17	16	16	15	15																															
1818	17	17	17	15	13	12	12	12	11	11	11	11	11	11																														
1817	18	18	18	17	15	15	15	14	14	13	13	13	13	13	13	13																												
1816	26	26	26	25	24	23	23	22	21	20	20	19	19	19	19	19	19																											
1815	9	9	9	8	8	7	6	6	6	6	6	6	6	6	6	6	6	6																										
1814	28	28	27	27	27	26	26	23	23	23	22	21	21	21	20	20	20	18																										
1813	21	21	21	21	20	19	18	18	18	17	17	17	17	16	16	16	16	16	13																									
1812	21	20	19	19	19	18	16	16	15	12	11	11	10	10	10	10	9	9	9	9																								
1811	24	24	24	24	24	23	22	22	22	22	20	19	17	17	17	17	16	16	16	16	16	16																						
1810	17	17	16	16	16	16	13	13	12	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10																				
1809	12	12	12	11	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9	9	9	9	9																			
1808	20	19	19	18	18	18	18	18	18	17	16	16	16	16	15	15	15	15	15	15	14	13	12	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11		
1807	17	17	16	16	16	15	15	15	15	15	14	13	12	11	11	11	11	11	11	11	10	9	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		
1806	16	16	16	15	15	14	14	14	14	13	13	13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12		
1805	32	32	31	30	30	27	27	26	24	24	22	21	20	20	20	20	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19		
1804	17	17	17	17	17	16	16	16	15	15	15	14	14	14	14	14	13	12	12	12	12	11	11	10	8	7	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
1803	26	26	25	25	25	25	25	25	25	25	25	25	25	25	24	23	23	22	21	20	19	18	16	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15			
1802	24	24	24	23	22	22	20	20	20	19	18	18	18	18	18	18	18	18	18	18	17	16	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15		
1801	20	20	20	20	20	18	18	18	17	17	17	17	17	15	15	14	14	14	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13		
1800	18	18	16	15	15	15	15	15	14	14	13	13	13	13	13	12	12	12	12	12	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10		
1799	17	17	17	17	17	17	15	15	14	13	13	13	13	12	12	12	12	12	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11		
1798	32	31	30	29	27	27	27	25	25	25	25	25	25	25	24	23	22	22	21	20	19	18	16	15	12	11	10	10	10	9	7	7	6	6	6	6	6	6	6	6	6	6		
1797	20	20	18	17	16	14	13	13	12	12	12	12	12	11	11	11	11	9	9	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
1796	24	24	24	23	23	23	22	21	20	20	20	19	18	16	15	15	14	14	13	13	13	13	13	12	12	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11		
1795	30	30	30	30	30	30	29	28	28	28	28	27	27	26	24	24	24	24	24	23	23	21	20	17	14	13	13	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10		
1794	26	25	25	25	24	24	23	23	23	22	20	20	20	19	16	15	14	14	13	10	9	9	8	8	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
1793	12	12	12	12	12	12	12	10	10	10	10	9	8	8	8	7	7	7	7	6	5	5	4	4	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
1792	18	18	18	17	17	17	17	17	16	15	15	14	14	13	12	12	12	12	12	11	9	9	8	7	6	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		
1791	18	18	18	18	18	18	17	17	16	15	15	15	15	14	14	11	10	10	10	10	10	9	8	8	8	8	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
1790	19	19	19	19	16	16	15	14	12	12	11	11	11	10	10	10	10	10	10	10	10	9	8	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7						

\* N. B.—From the nominations are excluded 11 cases, in which the persons nominated never came to India.

necessary to reject the year of appointment entirely from the calculations, and to assume the first year for the men appointed in 1790, as commencing from the 1st January, 1791, and so with all following years. The compiler of the tables, in the article of the GLEANINGS before referred to, has included this year in the computation of 852 as the number of appointments up to 1828, for he would otherwise have rejected the nominations of the last year of the series. His first year being, as is evident from this circumstance, that of nomination, he sets down the deaths upon the complete number of persons nominated as being, in the year of their appointment, only 2. The above table, however, shows six deaths in the year of appointment, or five, if the years subsequent to 1828 be thrown out; and this, without making any allowance for the eleven cases of appointed servants who never came to India, several of whom may have been prevented by death from availing themselves of their appointments. Whence the author of that article took his numbers, it is beyond me to guess; but it will stand to reason, that two deaths upon 850 appointments made in the course of 40 years, mostly a period of war, can be no near approximation to the risks of the voyage out, and the numberless accidents to which headstrong youth is liable. Six deaths, in the year of actual appointment, have been traced; but, as there is reason to doubt, whether this even can be the whole number, while, as above remarked, the period is never a complete year, it has been deemed better to take, as the first year for calculation of the value of life, that dating from the 1st January after appointment. The deaths of our next year are 17, which I confess my inability to reconcile in any way with the number of the GLEANINGS, which is 9 only for the two years' risk of life upon 809 appointments. It is not my business, however, to point out these discrepancies. The essential thing is to make out a statement that shall be free from error, or as nearly so as the case will admit; and that given above is offered as the best which our present materials afford the means of framing. In the table which follows, No. III, the ratio of deaths to survivors, in each year of residence, is attempted to be exhibited, the deaths being taken from the table above, and the number of persons whose life was at risk being thus computed: the total appointments between 1790 and 1831, were 951, of whom 11 died in England, or changed their mind, or from other cause never came to India. There remain 940, from which number must be deducted the ascertained deaths (5)\*, and retirements

\* The deaths upon 940 in the year of appointment were 6 by our table, but one of these belonged to the 29 nominations of 1831, all which being rejected from the calculation for the first year after appointment, and being deducted separately, this death must not be subtracted again. The deaths upon 940—29 or 911 were only 5.

(1), in the first year, being together 6; also the appointments of the year 1831 (29), which could not be included in the computation, unless the year 1832 were brought in. The number, therefore, of Civil Servants appointed between 1790 and 1831, who were in the condition to abide the chance of life for a first year, commencing from the 1st January after their appointment, was 905. Our table assumes 904, because there was one retirement in the year we are reviewing; and, as those who retire give the risk of their lives only for the broken period before their departure, the number of persons on the register on the 1st January requires correction on their account. It is assumed, that retiring servants give, on the average, the risk of their lives for half the year in which they retire; accordingly deduction is made, from the registered numbers on the 1st January, of half the number of the retirements between that date and the 31st December following. Where the number is uneven, as in this case being *one*, the deduction is made alternately to include or reject the unit. We thus begin with 904 lives, of which the proportion of deaths in the first year was 17, being in the ratio of 188 out of 10,000. For the computation of the ratio in the second year, we have the 905 men of the first year, minus the whole number of retirements (1), and deaths (17), in the course of that year, and minus also the appointments of 1830, which were 25, that is,  $905 - 43$  or 862. Of this number of registered servants on the 1st January of the second year, four retired in the course of the year: deducting two, therefore, for the diminished risk upon their lives, the number 862 stands corrected to 860, of which number 21 died in the year, being in the ratio of 244 out of 10,000. A separate value has thus been computed for each year of life in India, from the first to the thirtieth inclusive; after which the number of registered servants becomes too small to afford results at all trust-worthy. Before we proceed to the tables exhibiting the estimate of the value of life for each year, formed on this principle, it will be proper to exhibit separately the precise number of survivors in India, on the first of January of each year of their service; it being my purpose, as above explained, to compare these numbers, not with the original appointments as in the table of the *GLEANINGS*, but with the deaths of the year then commencing. I shall presently explain why no correct result could be extracted, from a comparison of the survivors with the number of original appointments, or even with that of arrivals in India. See Table, No. II.

Taking the table of survivors as the material for calculation, the ratio of deaths is exhibited for each year in the table which follows, No. III. The same ratio is reduced to a decimal proportion upon 10,000, for more ready deduction of the average of each five years, and for comparison with the tables of Europe. The number of deaths assum-

ed, and the moiety of retirements deducted in Table II, may be tested by comparison with Table I, in which all the appointments, deaths, and resignations are separately entered, according to the calendar year in which they occurred.

TABLE III.  
*Showing the Ratio of Annual Deaths.*

Years of Residence.	Age.	Lives at risk on 1 Jan.	Deaths during the year.	Ratio of Deaths upon 10,000.	Average of 5 years.	Average of 5 years, according to Table in Gleanings.	Average of Dr. Young's mean for England.	Ratios of column 5 adjusted by averages of five years.
1	20	904	17	188	203	128	$96\frac{1}{2}$	188
2	21	860	21	244				207
3	22	792	15	189				203
4	23	735	18	245				489
5	24	669	10	150				191
6	25	684	8	117	209	162	133	199
7	26	593	15	253				211
8	27	557	13	233				209
9	28	532	16	301				210
10	29	503	7	139				216
11	30	479	6	125	179	165	155	207
12	31	460	13	283				171
13	32	431	8	186				179
14	33	408	5	122				177
15	34	386	7	181				175
16	35	356	4	112	$214\frac{1}{2}$	205	170	$181\frac{1}{2}$
17	36	343	6	175				206
18	37	315	10	317				$214\frac{1}{2}$
19	38	287	7	244				268
20	39	266	6	225				$317\frac{1}{2}$
21	40	238	9	378	$370\frac{1}{2}$	411	203	$349\frac{1}{2}$
22	41	212	9	424				391
23	42	189	9	476				$370\frac{1}{2}$
24	43	165	5	303				$372\frac{1}{2}$
25	44	147	4	272				421
26	45	129	5	388	403	811	247	348
27	46	105	7	666				394
28	47	90	1	111				403
29	48	75	4	533				407
30	49	63	2	317				407
31	50	51	0	0	582			
32	51	42	0	0				
33	52	36	3	833				
34	53	27	2	741				
35	54	22	0	0				
36	55	17	1	588			326	
37	56	11	1	909				
38	57	8	0	0				
39	58	6	0	0				
40	59	5	0	0				
41	60	3	1	3,333				



TABLE IV.

*Showing the Annual Decrement of life, according to the adjusted annual value of Life in India, as compared with the latest Tables for England, and with the rate of Decrement in the Gleanings for September, 1881.*

Dr. Young's general mean of decrement for England, calculated upon 100,000 Births, and commencing with survivors at 20 years of age.			Decrement in India upon the same number, calculated for each year at the adjusted annual ratio of Deaths of Table III. last column.		Decrement upon the number of survivors at the age of 20 out of 10,000 births, according to the Northampton Tables as given for India in the Gleanings.	
Age.	Survivors	Deaths.	Survivors.	Deaths.	Survivors.	Deaths.
20	52221	452	52221	981	5132	63
21	51748	473	51240	1061	5069	64
22	51259	409	50179	1019	5005	65
23	50737	557	49160	929	4940	66
24	50180	610	48231	921	4874	67
25	49570	652	47310	941	4807	68
26	48918	655	46369	978	4739	69
27	48263	664	45391	949	4670	69
28	47599	682	44442	933	4601	70
29	46917	704	43509	940	4531	71
30	46213	709	42559	981	4460	72
31	45504	711	41578	711	4388	73
32	44793	710	40867	732	4315	75
33	44083	708	40135	710	4240	77
34	43375	710	39425	690	4163	79
35	42665	712	38735	703	4084	81
36	41953	718	38032	783	4003	83
37	41235	723	37249	799	3920	85
38	40512	728	36450	977	3835	87
39	39784	740	35473	1126	3748	89
40	39044	762	33147	1158	3659	96
41	38282	780	31989	1155	3563	110
42	37502	796	30834	1142	3453	130
43	36706	803	29692	1105	3323	150
44	35903	808	28587	1203	3173	175
45	35095	830	27384	953	2998	198
46	34265	850	26431	1041	2800	198
47	33415	867	25390	1023	2602	198
48	32548	880	24367	992	2404	198
49	31668	900	23375	951	2206	198
50	89208		22424		2080	

The results of the first of these tables by no means correspond with those given in the GLEANINGS, and will not admit of very ready comparison. The ratio of deaths, however, to the number of survivors set down for each year in that article, has been calculated in order that the extent of discrepancy may be seen. But it strikes me, that there is a fallacy in the GLEANINGS' Table, which, besides that there are errors in the numbers assumed as above pointed out, must make it valueless for any

computation of the risk of life in India. The basis of calculation for each period there taken is the following. The number of appointments made between 1790 and 1819, (I take this year at random,) is stated at 603. By the end of 1828, the last year's servants will have been 10 years in India, or at least on the register; and computing the results of all these appointments for 10 years, it is found that there were 39 retirements and 77 deaths amongst them in that period. It is hence assumed, that in 10 years 77 deaths take place in 603, minus 39, or 564 cases of persons resident in India between the ages of 20 and 30, leaving 487 survivors. But how can this be a true ratio, when the risk of life upon the 39 cases of retirement, *while they remained in India*, is lost to the calculation. This number should not have been deducted from the 603 appointments as consisting of cases taken out of the life risk altogether; but if any correction were attempted, it should have been made by deducting only half the number, on the principle that the country had the risk of their life while they staid in it, which may be computed on the average at a half risk. The number of deaths would then perhaps have borne a pretty correct proportion to the appointments, but the number of surviving residents would have needed a like correction. The omission to note this makes but little difference, perhaps in the earlier years, wherein there are comparatively few retirements, but it has wonderful effect on the ratios of the later. Take for instance the 25th year, of which the data are as follows: appointments from 1790 to 1804, 341; resignations out of these in 25 years, 93; deaths, 105. Now, it makes a very material difference whether these 105 deaths are to be taken as 105 out of 341, minus 93, i. e. out of 248, giving 143 survivors, as in table the second, page 274, or 105 out of 341 minus  $\frac{93}{2}$  or 46 being 295, leaving 190 survivors. The number of survivors in India is however the actual number found in the registers that cannot be changed, and the calculations of the GLEANINGS' article are made on this number. The question therefore is presented in a different shape, and if this number be made the basis of any estimate or calculation, there must be corrections applied to settle out of how many these are the remnant from the effect of *mortality only*. For the fact, that many servants, after abiding the risk of life for 20 years, have at last withdrawn themselves while still living from both the survivors' list and from the original number, must leave the deaths upon the remaining appointments to bear a much higher ratio than they ought to do. Suppose, for instance, out of 100 arriving in a given year, 40 die in the course of 25 years, and 40 more having given the risks of their lives

for 20 years, retire living between the 20th and 25th, then, by the table at page 274 in the GLEANINGS, these 40 being deducted from the 100, the deaths would be stated at 40, out of 60, and the survivors only 20 of *that* number. This circumstance, viz. the fact that the retirements come mostly in the later years of service, will of itself explain the wide difference apparent in the value of life in the later years, compared with the earlier as exhibited in the article in question, and remarked upon there as if fully established. The table at page 274 shows a decrement of very nearly 1-12th of the number living, for each year, from the age of 45 to 50, which is out of all reason: one in 41 to 1 in 37 is the ratio of the Northampton tables quoted for the same age, and the difference of climate cannot surely triple and quadruple this mortality at that period of life\*.

Looking upon all computation from the *number of survivors* after a given period as impossible, in consequence of the large proportion of retirements in the advanced years of service, I am compelled to reject the tables of the GLEANINGS altogether, and offer instead those given above, which are based, as already explained, upon a comparison of the number of deaths in each year of service, with the number living, and in India on the first day of the year. This reduced to a decimal proportion will allow a comparison to be made of the value of life in each year, with the value assumed in the best approved tables of Europe. The retirements will not much affect a calculation made on this principle, and unless error can be detected in the numbers assumed for the deaths on one hand, or for the total of risks on the other, I am not aware of any ground on which the comparison can be impugned. Proceed we therefore to this part of the subject, and first for the age of appointment. In the article of the GLEANINGS this is taken at 20 years. Now, considering that 15 years was heretofore the age of earliest appointment, and 22 years the latest permitted by Act of Parliament; considering too that until 1806-7, there was no detention at the Hertford or Haylebury College, but those appointed were at once shipped to their destination; so that many actually reached India before they were 16: this assumed age appears too high, 17 years for the age of arrival before the establish-

\* Per Table in the Gleanings.      Per Northampton ditto.

Age.	Deaths.	
45	.... 1 in 15	..... 1 in 41
46	.... 1 in 14	..... 1 in 40
47	..... 1 in 13	..... 1 in 39
48	..... 1 in 12	..... 1 in 38
49	.. ... 1 in 11	..... 1 in 37



ment of the College in England, and 19 for the average subsequently, or for the general average 18 years would seem to be a fairer estimate; but we will allow 19, for the convenience of assuming the same period of life for our results, as the article in the *GLEANINGS*; for as in the above tables the first year is reckoned from the 1st January following the appointment, we have then 20 years for the age of those whose risk of life is computed for that year. In Tables III. and IV. I have attempted a comparison of the value of life in India, from the age of 20 to 50, as afforded by the above tables for the Civil Service on one hand, and as given in the most approved tables for the same age in Europe on the other.

It will be seen, that for the value of life in Europe, I have taken the general mean prepared by Dr. Young, by compounding the Northampton and Carlisle tables with the London Bills of Mortality, and with the rates of the Equitable Life Insurance. This I believe to be the latest estimate of the kind that has been published. It will be found in the volume of the Philosophical Transactions for 1826, and Dr. Young's celebrity as a calculator entitles it to be received as of first rate authority.

In Table III. in which the annual deaths are given as they occurred, with the ratio calculated to a decimal proportion for each year, there will be found an average of the same decimal ratio for each five years of the period embraced in the calculation. In order to afford the means of ready comparison, I have also computed the ratio of deaths to the annual survivors, as given in the table in the *GLEANINGS*, and in Dr. Young's table of the decrement of life, and have reduced both to a decimal proportion to 10,000. It will be seen, that my result is for the first five years of residence in India, commencing at the age of 20, a risk for each year of 203 in 10,000. The tables of Europe make the risk at the same period of life only  $96\frac{1}{2}$  in 10,000, while the table in the *GLEANINGS*, professing to be based on the same materials with my own, but calculating from the number of survivors upon a total of appointments, from which retirements have been deducted, gives 128. There are errors in the number of deaths, which account for much of this latter difference; for if a due number of deaths had been taken for the first two years, there is no reason why in this part of the table there should be much variation. The result of the comparison with England is, that the chance of death between the ages of 20 and 25 is to Europeans residing in India under the most favorable circumstances, more than double what it is in England; and this may well be imagined to be the case under the risks from Fever and exposure to the climate, independently of other causes.

In the second five years our proportion is 209 out of 10,000 for each year's deaths, whereas in England it is only 133; but this difference is no longer double, it is only a little more than 3 to 2. The GLEANINGS' table gives 162.

The third lustrum of residence is the most healthy period, according to our table, and experience is in favor of the same conclusion. The constitution is now adapted to the climate, and the seeds of premature decay, though they may have been sown, have not had time to produce their effect. For this period of life India is nearly as safe a place of residence as England, and it is the only period during which there is any proximity at all in the ratios. From this time forward the yearly value of life progressively and regularly decreases as age advances, and it will be observed to do so much more rapidly in India than in England. The error of principle in the calculations of the GLEANINGS begins to be particularly observable in the ratios for the two periods following the fourth. From 205 in 10,000, the rate of the third period, the deaths according to that table advance to 411 for each year, after a residence of 20 years, and to 811 for the years between 25 and 30 of residence. Our result, though as compared with the general mean for England, worse for Indian residents of this standing, in the proportion of 5 to 3, is nevertheless much less unfavorable than the rate above quoted; indeed, for the last period our rate is less than half that of the GLEANINGS.

The results for the years after the 30th of residence, are founded on too low numbers to be built upon, and yet the average on the totals to the 41st year comes pretty nearly to the rate one might have expected. The further deterioration of value corresponds with that afforded by the mean tables of Dr. Young for the same period of life, and may be noted as a curious result, though the ratio cannot be looked upon as established.

In Table IV. I have thrown the results of Table III. into a form to shew the *decrement* of life according to my computation of its value for each separate year. This has been done merely to satisfy the curiosity of those who delight in seeing the same results in different shapes; and because the published tables being ordinarily in this form, it is convenient to present the means of ready comparison by giving one to correspond. For any purposes of calculation, the separate value ascertained for each year of Indian life, from the age of 20 to 50, seems the more useful result to depend upon.

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III.—On the Gypsum of the Himalaya. By Capt. P. T. Cautley,  
Ben. Arty.

While there appears to be a general unwillingness on the part of geologists to admit the gypsum of the Alps as a recent formation, the leading authorities in that science are divided whether to consider it as *primitive*, or to class it among the indefinite *transition* formations.

M. Brochant has reviewed the gypsum formations of the Alps, and given his opinion on their relative antiquity : we have also accounts of other countries, betraying the same uncertainty with reference to the point at question : and perhaps we may not be far wrong in attributing many of the doubts in the classification of gypsum and other similar minerals, to the very interpolation of the order *Transition*, an arrangement convenient enough as offering a resting place for every variety not stamped with the decided mark of primary or secondary, but to the scientific inquirer a most deplorable bar to *precision*, a term not inapplicable altogether to the science, as we may hope to find it under a revised, well arranged, and *permanent* nomenclature.

The gypsum of the Paris basin, that accompanying the red marle of England, and that of other similar localities, have been acceded to as secondary formations by all geologists ; while those found in the higher mountain ranges of the globe have from their singular and generally ill-defined position, placed authors in doubts as to their classification. M. Brochant argues, that from the similarity of appearance in Gypsum rocks, he should be led to ascribe them all to the same æra ; and from his own observation decides, that they all belong to the *transition* series, with this difference, which he deems important, that the ancient secondary gypsum of Bavaria, Saltzburg, &c. &c. reposes on strata essentially posterior to the transition class ; an objection, as De la Beche observes, nugatory from the frequent conjunction of the primary and secondary strata, exemplified by the oolite of the Jura resting on gneiss in the Rhine, &c. But although we find the superior classes of the secondary rocks in *conjunction* with the higher classes of the primary, the latter order is never found reposing on the newer formations ; indeed the only example given of an occurrence of this sort is by McCulloch, of gneiss on a secondary rock, which is noticed in the preface to Conybeare's work, and exemplified by a drawing, most satisfactorily explaining the deception.

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\* The term *secondary*, as here used, includes what is generally called *tertiary*.  
—ED.

Saussure, Daubuisson, and others, have conceived some of the Alpine gypsum to be primary ; that of Cogne, mentioned by Brochant, as discovered and considered primitive by Daubuisson, obtaining the distinction from a superincumbent stratum of lime-stone "a little crystalline, blueish grey, and very schistose from a mixture of talc ;" the gypsum having no outcrop whatever, and consequently being imbedded in the above rock ; and, as M. Brochant says there is every reason to suppose that the schistose limestone of the roof contains quartzose veins, as also happens in transition limestone, he, rather gratuitously, concludes that the formation is contemporaneous.

The presence of these quartzose veins, which is the *type of transition*, and the absence of outcrop, rest on the mere ipse dixit of the villagers, and can hardly be received as proofs in a matter where direct geological accuracy is concerned. The deposit also of Val Canaria is a very doubtful proof of the existence of gypsum primarily. The fact of its underlying mica slate is contradicted by Brochant, who thinks the same of his transition variety. The proof of its being primitive is therefore still far from being ascertained, and I propose in a future part of this paper to suggest causes that might place in doubt, even the superincumbence of mica slate as a proof of its antiquity. The general description given by writers on the subject of Alpine gypsum, so closely applies itself to the mineral lately found in the line of mountains north of the *Dehra Dûn*, both in regard to its position and its attendant rocks, that a comparison becomes exceedingly interesting, as illustrative of the difference, if there be any, of the gypsum decidedly secondary, and that which is accompanied by rocks of evidently a more ancient formation.

The localities which have come under my immediate observation are two of those adverted to by Captain Herbert, in his communication to the Society. The first near *Sansardhâra*, immediately on the skirts of the mountains bounding the valley of *Dehra*, on the north : the second about four miles further north, near the village of *Salkot'h*, differing in position most essentially from the former, though resembling it in character ; to enter into a detail of each, with its respective peculiarities will be necessary in furtherance of the history of the rock in question.

#### *Gypsum opposite Sansardhâra.*

Immediately opposite the stalactitic caves, and beyond the rapid stream that runs towards the village of *Nagul*, a passage into the mountains is effected up the course of one of its tributaries, which branching off to the left, leads you at once to the gypsum, the prox-



imity of which becomes apparent from the masses and broken pieces in the bed of the stream. A considerable slip in the mountain, of a very recent date, displays the position of the rock, which would doubtless otherwise have remained concealed, as no vestige whatever can be found on the unbroken surface of the mountain. To give therefore an explicit account of its actual dimensions, or even to describe the locality, is perfectly impossible, further than what is exhibited to the eye: from the confusion attending on these fractures, and the precipitous and irregular structure of the mountain, covered with vegetation and an impervious wood. The gypsum is apparent here in two beds or strata, separated by a reddish argillaceous schist, and reposing upon a blueish limestone, in contact with which there are evident signs of passing one into the other. Independent of these beds or strata, unconnected and insulated masses of gypsum appear throughout the schist, the whole lying horizontal without any apparent dip or inclination. Beneath the blueish limestone, on which the lowest stratum rests, are varieties of a lime rock, of a darker color, reticulated with veins of calcareous spar, large rhomboidal crystals of the latter being found of considerable size, and in a much greater proportion than in the neighbouring mountains: indeed, the debris formed by the slipping of this face of mountain is altogether composed of these varieties of limestone, fragments of calcareous spar, and the pieces of broken gypsum and schist. The quality of this gypsum varies as much as its color; the former from a compact crystalline mass, to a loose, powdery, and arenaceous soil, hardly to be termed rock; the latter from a pure white, slightly translucent at the edges, to a dirty grey, particularly in its passage into the limestone. The colors however are exceedingly various: a brilliant yellow variety was discovered in great abundance. The height of this deposit from the bed of the stream is about 1000 or 1200 feet. The mountain series decidedly calcareous.

#### *Gypsum at Salkot'h.*

The former gypsum I have explained as alternating to all appearance with argillaceous schist, and forming a series with rocks, the antiquity of which may be a matter of remark hereafter. This gypsum is apparently superficial, and entering into the series more as an independent formation, than as a feature expressive of the general structure of the mountain. It shows itself opposite that village, about four miles north of *Sansadhāra*, jutting from the face of the mountain in a bold and irregular outline, to the height of about 200 feet from

the bed of a tributary that joins the Nagul stream, opposite the village of *Salkot'h*. The whole mass is composed of gypsum, without the intervention of any alternating rocks ; and a conclusion may naturally be drawn from the absence of the mineral in its vicinity, that this deposit is insulated, or simply an enormous nodule, resembling those of calcareous tufa so frequently met with, in detached and unconnected masses. The falling down of large masses of the upper part of the rock has caused such confusion and irregularity below, that it would be even doubtful whether the deposit actually extends to the bed of the stream, or whether its limits might not properly be curtailed to a depth of at least one-half, a circumstance moreover that precludes the possibility of discovering the rock on which it lies, or of satisfactorily describing the concomitant formations. The same difficulty generally occurs with these rocks; their decomposition is universally great, and the extreme variableness in texture so open to the attacks of weather, that externally, without the aid of slips and fractures, it is almost impossible to detect any regularity in stratification, or in fact any clue wherefrom to form an idea of their general character. The tendency that this rock has to form itself into peaks and protruding points is well preserved here, and deserves mention from a peculiarity for which it is distinguished in the Alps; resting solely however upon the decomposing character of the rock, and from no material *form* of composition. The mountain itself is formed entirely of the blueish limestone formerly mentioned, into which the gypsum decidedly passes, modifying itself into a blueish variety, effervescent, and differing only in appearance from the limestone itself, by its want of compactness, and loose and friable quality: a black fragmentary and argillaceous lime rock is also in abundant dissemination throughout the lower part of the deposit, and singularly attached to those parts where the gypsum appears to be of a purer quality than at others; indeed it generally appears that by the presence of the rock in question, the mineral acquires a purity both in color and texture, unobtainable in those parts in contact with the blue limestone or at a distance from the black rock. It would be endless to enumerate the colors that appear throughout this formation; from the purest white crystalline, it passes through dirty grey pink, until it arrives at the blue limestone, when it obtains a tinge of that color. The texture is also as variable, and I may say, that throughout the whole deposit a very small proportion is of that variety generally known by the name of alabaster; and

even those parts so fragmentary, and so interspersed with the coarser varieties, that any attempt at converting it into ornamental uses would, I fear, be out of the question. The specimens that I have seen in cups and small vases fully authorize this conclusion: their appearance being more of a white earth, or chalky limestone, than of a gypsum, or to speak in plain terms, of an alabaster. The varieties of Himalayan gypsum as yet discovered are certainly deficient both in beauty and value as an article of use, though interesting for comparison with other formations.

Selenite, in small tabular crystals, is disseminated throughout this gypsum, though in hardly sufficient abundance to give any peculiar character to the formation.

A question of considerable interest arises from the appearance and position of the above-mentioned deposits, which, as mentioned in a former part of this paper, from their position under rocks of the primary and secondary classes, acquire an appearance of antiquity, not borne out by the general history of the mineral; namely, that the gypsum throughout the globe is simply an infiltration analogous to the tufa and calcareous deposits, and depending on causes chemically similar; the sulphuric acid being the active generator instead of the carbonic. If in the proximity of sulphur an excess of oxygen would produce sulphuric acid, a difficulty is removed, and the contact with lime-rock or carbonate of lime would, it may be supposed, produce its sulphate, or gypsum; and I cannot perceive the improbability of such a process having been or being still in force; or that nature's laboratory might not have been as active in the dissemination of gypsum, as it is in the present day, of the calcareous tufa.

The argument obtains considerable weight from a most material circumstance, which almost makes it a matter of certainty that the origin of all gypsums is contemporaneous; this is, the exact resemblance both in texture and crystallisation that they all bear, whether Alpine, or those varieties found with the secondary rocks: a similarity that does not exist in any of the lime-stones formed at different periods, nor in other rocks: the primary and secondary varieties shewing the most decided dissimilitude both in texture, quality, and position.

The term infiltration must be received, as implying the simple power of a mineral in solution to insinuate itself into cracks and fissures, or to fill hollows and cavities, without any reference to a gradual process, as it is possible that the mineral in question might in many instances (parti-



cularly in those deposits where an appearance of stratification or alteration with other rocks is apparent) have undergone a change, more sudden, and more general, than what we understand by the term "infiltration," as applies to the formation of calcareous tufa. A question may be put, as to the absence of any impressions of vegetable remains,—as to the want of the cylindrical and radiated texture, which so peculiarly marks the tufa in formation? It must be confessed, that on comparing the minerals, and supposing the process under which they are found to be *similar*; difficulties, though not irreconcilable to the above supposition, present themselves. In the first place, the action of sulphuric acid would tend in a much more rapid degree to the formation of gypsum, than does the presence of carbonic acid and lime to produce tufa. The same rapid action would create a texture of a totally different quality, and the ingredients themselves would destroy any vegetable remains that might be enveloped in the mass: had the same gradual and slow process that forms the tufa been also exerted in forming gypsum, similar texture would have been the consequence; and the deposit of the latter would shew at least marks of stalactites, &c.; but though infiltration is granted as a solution of the problem, the action of time and other causes may have removed those outward and visible marks that might have tended at once to a direct conclusion. Age, pressure, and other causes, are well known as the means of producing most extraordinary changes in the system, and also in the texture and quality of the rocks themselves. The above causes, in a greater or less degree, may have equally exerted their effects on gypsum.

The obvious transition of the blue limestone into the gypsum at the deposit at *Salkot'h*; and the extreme purity of the gypsum when in contact with the black fragmentary rock, which scarcely effervesces with acids, leads me to the idea that all these varieties of lime-rock in the proximity of the mineral are simply modifications, caused by the action of the sulphuric acid in a greater or less degree. The springs and rivers in the vicinity of all these formations abound in carbonic acid, as is evident from innumerable deposits of tufa, and stalactitic formations;—while the rocks themselves are of limestone:—near *Sansadhára*, sulphur and sulphuretted hydrogen impregnate the waters, and it is at least plausible to suppose from the occurrence of gypsum, that the presence of sulphuric acid is one, if not the main cause of the superabundance of carbonic acid diffused through all the springs, and leading to the tufaceous and stalactitic deposits of lime that not only appear

in such magnificence at the caves of *Sansardhára*, but actually give a coating to the bed of the streams, and are the cause, I conclude, of the enormous excess of local conglomerate that appears throughout the whole of the ranges, of which *MasúríTiba* and *Bhadráj* form such prominent features; the latter mountain terminating the range towards the Jumna, whilst the eastern or opposite extremity, under the name of *Skanda Déhi*, is washed by the Ganges. The yellow color of some varieties of the gypsum may depend on the contact with sulphur\*, the abundance of which mineral may be concluded from the sulphuretted waters above alluded to:—that it was so in former times, is sufficiently shewn by the existence of the gypsum itself. Whether it is not daily forming may be a matter of doubt, at least in the above localities: we find independent masses of tufa apart from the proximity of springs and water, the course of the latter having changed or dried up; at least the argument would stand thus on the discovery of a mass of calcareous tufa similarly situated to the gypsum deposit of *Salkot'h*, or that of other countries, not forgetting the primary deposit of *Daubuisson* at *Cogne*!

If therefore where carbonate of lime, sulphur, and water are abundant, the chemical change above mentioned, is allowed, or is supposed from analogy to be a probable consequence, gypsum can no longer be entitled to a place in either primary transition or secondary classes; but must be considered as an adventitious formation common to all ages, and produced by causes analogous to the present rapid formation of calcareous tufa. Amongst our primary and transition rocks, none can be assimilated to the stalactitic carbonate of lime; amongst our secondary or latest class of general rocks, there is none like the gypsum, that is to say, we know of none actually forming at this day. Causes that led to the formations of such abundance of gypsum formerly, may from unassignable reasons, no longer exist; and those which produce the tufaceous carbonates, then at rest, may now be in full vigor.

The above reasoning is not affected by any account of a gypsum deposit that I have met with, and although the regular stratification or alternation of gypsum with clay slate, as above alluded to, may at first be a startling objection to the proposed theory, it will on examination be easily accounted for. The above discovered deposit of gypsum was assumed actually to consist of strata, but this is somewhat doubtful.

\* Is not the yellow color due to the presence of oxide of iron?—ED.

To those who may differ with me on the subject, I must observe in conclusion, that gypsum has never been found in a country or district where the presence of the lime carbonate has been wanting ; but mostly in a position surrounded by vast tracts of that mineral, rising in successive ranges in the vicinity of springs and running streams, whose courses are marked by their deposit of lime, in the presence of springs impregnated with sulphur and sulphuretted hydrogen. When the very ingredients are at active work at the present day in the manufactory of stalactite, may we not with circumstantial evidence at least, convict them of pursuing a different course, and under different times and circumstances of forming *gypsum*!

P. S. I may mention another deposit of the mineral on the *Masúrí* range, on the descent from the ridge or spur upon which Capt. Brooke has fixed his residence, to the valley of the *Aglar* river. There are also appearances of it on the ascent from *Rajpúr* via *Jaráipani* to *Masúrí*, in the black fragmentary rock interspersed with minute threads of the gypsum, although, as far as my observation has been directed, the mineral at this point does not appear in mass : at the former deposit however, on the slope to the *Aglar* river, we find it in great abundance, though in quality by no means superior to the *Salkot'h* variety ; the situation is partly to the right and left of the foot-path on the ascent, in large nodular masses, or independent rocks, whose outer surface exhibits the usual sharp angular and pointed features, and partly in irregular lumps imbedded in the debris of a huge slip of the mountain, which must have fallen within the last few years, as it bears every appearance of freshness. Unless we are to suppose that the mountain from which this slip has taken place was in itself formed of debris, and the rounded boulders of water-worn rock, which I may safely assume not to be the case, the appearance of these detached masses of gypsum is very unusual ; they neither look like pieces broken off from a large mass in the fall of the mountain, nor have they the least resemblance to boulders ; but from their uneven honey-combed surfaces, I could almost bring myself to imagine, that they had been formed by infiltration into holes and fissures in the rock or soil ; the outer surface decidedly having the appearance of being formed in a mould which the irregular internal surface of a natural cavity would exhibit. These pieces vary in size, but do not exceed in dimensions a cubic foot or thereabouts.

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## IV.—Climate of Chirra Punji.

(Extract from a letter to the Surveyor General of India, from Dr. W. Rhodes.)

The remark in the *Hurkaru*, "that the rains had set in with great violence at Chirra," is incorrect. By a reference to the accompanying Table it will be observed that, for the last 20 days of the month, the weather has been remarkably fine and almost free from rain.

By a self-registering thermometer set at the beginning of the month, I find that the temperature during the day has been as high as 76, and at night as low as 56. The climate now is very delightful, and surpasses the finest summer months in England.

Chirra Punji, 3rd June, 1832.

W. R.

*Meteorological Register kept at Chirra Punji, for May, 1832.*

OBSERVED AT 10 A. M.							OBSERVED AT 4 P. M.					
Date.	Barometer.	Thermometer.	M. B. Ther.	Wind.	Strength.	Aspect of the sky.	Barometer.	Thermometer.	M. B. Ther.	Wind.	Strength.	Aspect of the sky.
1	25,780	64	63½	W.	Var.	Rain.	25,740	67	67	S.W	Var.	Cy. Rain.
2	766	63	63	S.W	do.	do.	760	63	62	do.	do.	do.
3	850	64	64	W.	Stg.	do.	764	63	63	do.	do.	do.
4	800	62	61½	S.	Var.	do.	788	63	63	do.	do.	do.
5	790	62	61	W.	do.	do.	696	61	59	E.	Lt.	Cloudy.
6	786	63	62	W.	do.	do.	710	63	62	W.	Var.	Cy. Rain.
7	784	63	62	S.W.	do.	Cloudy.	690	62	62	do.	Lt.	do.
8	730	59	50	do.	do.	Rain.	700	62	61	S.W	Var.	Cloudy.
9	736	61	60	do.	Stg.	do.	795	63	62	W.	Lt.	Cy. Rain.
10	850	65	64	W.	Var.	Cum.	780	70	65	do.	Var.	Clear.
11	860	67	65	do.	do.	Cloudy.	720	69	65½	S.W	do.	Cloudy.
12	836	69	66	do.	do.	Clear.	700	68	65	do.	do.	do.
13	700	64	64	do.	do.	Cloudy.	700	68	66	do.	do.	Clear.
14	750	62	61½	S.W.	do.	do.	700	67	65	do.	do.	Cloudy.
15	800	65	62	W.	do.	Clear.	750	69	65	W.	do.	do.
16	818	67	64	Cm.	do.	do.	750	64	63	do.	do.	Clear.
17	820	67	63	do.	do.	do.	760	69	65	do.	Lt.	do.
18	830	70	65	W.	Var.	do.	770	71½	70	do.	do.	do.
19	854	64½	64	do.	do.	do.	800	67	66	do.	Var.	Cloudy.
20	800	66	61	do.	do.	do.	784	68	64	S.W	do.	Clear.
21	820	67	63	Cm.	do.	do.	750	70	66	W.	Lt.	do.
22	804	67	62	do.	do.	do.	760	69	63	do.	do.	do.
27	732	71	69	do.	do.	do.	706	73	64	S.W	do.	do.
28	750	72	69	do.	do.	Cloudy.	684	73	69	Cm.	do.	do.
29	760	70½	68	do.	do.	Clear.	680	71½	68	S.W	Lt.	Cloudy.
30	766	71	66	S.W	Lt.	do.	698	71	65	do.	do.	Clear.
31	750	71½	69	Cm.	do.	Cloudy.	700	72	68	do.	do.	Cloudy.
Mns	25,790	66,2	63,5				25,736	672	64,5			



V.—*Proceedings of the Asiatic Society.**Wednesday, the 4th July, 1832.*

The Hon'ble Sir C. E. Grey, President, in the chair.

1. Mr. J. Pearson was elected a Member of the Society.

2. The Acting Secretary reported, that the amount of the late Dr. Bruce's legacy had been received and invested in Government Securities.

3. Upon the motion of Mr. F. C. Strong, seconded by Mr. D. Ross, the following resolution was passed unanimously :

“ A Report upon the progress of the boring experiment having been submitted at the last meeting of the Physical Class, 13th June, from which it appears, that a second perforation has been commenced upon and carried down to the depth of 160 feet successfully, having been already tubed to the depth of 120 feet : and further, the Government having expressed great interest in the result of the experiment, and having through Colonel Casement, Military Secretary, placed at the disposal of the Physical Class the services of three European soldiers of the Sapper and Miner Corps, lately arrived from England, who have been regularly instructed in the art of boring for water,—

*Resolved*, that a sum of Rs. 500, in addition to the 2000 already expended, be placed at the disposal of the Committee, for the further prosecution of the boring experiment.”

4. *For the Museum*.—Mr. F. P. Strong presented a flying fish.

Mr. J. F. Cathcart presented a specimen of a Cape fish, called there “ Sea-horse fish ;” also a pair of Cape pheasants.

Captain Sanders, Engineers, presented an ancient coin recently procured at Kanouj, by Mr. E. V. Irwin, C. S.

5. *For the Library*.—The following rare and valuable works were presented by the Hon'ble Sir C. E. Grey, President.

Lexicon Græco-Latinum Constantini, 1592.

Platonis Opera Omnia, 3 vols. folio, 1578.

Aristotelis Opera Omnia, 11 vols. 4to. in 6, 1587.

Ciceronis Opera Omnia, 10 vols. 4to. 1783.

The works of Dugald Stewart, 5 vols. 4to. London.

Histoire de la Philosophie Moderne, par Jean Gottlieb Buhle, 6 vols. 8vo.

The following works were also laid on the table :

Lament on the capture and destruction of Edessa, an Armenian Poem, written in the middle of the twelfth century, by Nierses Shinorballi, published in Calcutta, in 1832 ; presented by the Editor Mr. John Avdall.

Dictionary of the Tamul and French Languages, presented by Lieut. A. Blin, Mem. As. Soc. Paris, who announces his intention of publishing a French translation of Shakespear's Hindustani Grammar, printed “ par le procédé autographique.”

Meteorological Register for April—from the *Surveyor General*.

*From the Translation Committee of  
the Royal Asiatic Society.*

Subscription copies of

- No. 1. Translations from the Chinese and Armenian, by C. F. Neumann, 1  
2. Life of Sheikh Mohammed Ali Hazin, ..... 1  
3. Miscellaneous translations from Oriental languages, vol. 1st, ..... 1  
4. The Algebra of Mohammed Ben Musa, ..... 1  
5. Life of Hafiz-ool-Moolk, Hafiz Rehmüt Khan, ..... 1  
6. Travels of Macarius, ..... 1  
7. History of the Maritime Wars of the Turks, ..... 1  
Annual List of Donations and Bequests to the Trustees of the British Museum, 1830 ; *from the Trustees*, ..... 1  
Journal Asiatique, Nos. 44, 46, and 47. *From the Asiat. Soc. Paris*, ..... 3  
Considérations sur les Alphabets des Philippines. By Monsr. Jacquet, Paris,—*the author*, ..... 1  
The Christian's Magazine, No. 1 to 10, Pampt.—*unknown*, ..... 10  
List of the Geographical Society of London, January 1, 1832. Pamphlet,—*the Society*, ..... 1  
Proceedings of Do. Do. Nos. 22 and 23,—*the Society*, ..... 2  
Observations sur quelques points de la Doctrine Samaneenne, et en particulier sur les Noms de la Triade Supreme, par Monsr. M. Abel Remusat,—*the author*, 1

*From the Secretary to the Société  
de Caen.*

- Essai sur les Combustions humaines, Rapport fait par M. P. A. Lair, à la Société Linnéenne de Normandie, &c. .... 7  
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*Papers read.*

1. Answer to Dr. Milman's questions respecting the Indian Jews, by Daood, a respectable Jew residing in Calcutta. Communicated by Dr. J. Tytler.

These answers refer only to the recent establishment of Jews in Calcutta itself, not to those who have become naturalized on the Malabar Coast.

2. A descriptive Catalogue of the ancient Roman Coins in the Society's Cabinet. By Mr. J. Prinsep.

3. Translation of a fragment in the Tibetan language, by Mr. Csoma de Körös, with remarks by Mr. H. H. Wilson, Sec.

4. An Analysis of the remainder of the *Kahgyur*, by Mr. Wilson, was also laid on the table.

On the conclusion of the business of the evening the President rose, and addressed the meeting (which was unusually numerous), in the following words :—

“ Gentlemen,—The pleasure of meeting a more numerous body of the Society than is usual, makes it impossible that I should find fault with my friend Mr. James Prinsep, for having added to the notices of the meeting an intimation that I should take my leave of you this evening. I regret only that it may have caused an expectation that I should offer a more complete tribute of gratitude than I am capable of expressing, or that I should have prepared for the Society one of those comprehensive views of the fields of literature, science, and art, which have been usual on similar occasions, and which generally are well adapted to them, but which I do not think would be suited to that of my own departure. Having never entered the vineyard as your fellow-labourer, I will not cull the fruits produced by the labour of others, that I may claim a merit for merely laying them before you, and arranging them. I feel, that there is little which it would become me to say on this occasion, but to excuse myself for what I have omitted to do. But it has always been known to you, that I neither have nor ever pretended to have any acquirements in Oriental Literature: and I should have almost thought it incumbent on me to decline even the gratification of being elected your President, if I had not regarded it as an honorary appointment, and known at the same time that as long as Mr. Wilson continued to be your principal Secretary, the Society could not suffer from any deficiencies of mine.—Gentlemen, he has really been your President: and I rejoice, that his absence from Calcutta affords me the opportunity of saying what I could not so well have said of him in his presence. Whether you consider his unrivalled attainments in Sanscrit Literature, or the many valuable works with which he has enriched your Transactions, or which he has otherwise given to the world, or his indefatigable and most meritorious devotion of his time and talents to the establishment of an extensive system of education for the native youth, or the many amiable qualities which distinguish him in private life, you must all feel that if you should lose *him*, of which there is at present some likelihood, you will indeed sustain an irreparable loss:—yet a loss not to be deplored by his friends, and least of all by me; for it might afford me the hope of meeting him soon amid other scenes, where the happiest portion of my youth was passed, and which, now that I am turning homewards, rise upon my waking memory with the vividness and imaginary beauty of a dream. This would indeed be to me a source of infinite pleasure, if it was not qualified, and if my mind was not divided, if I may use the expression, by the reflection that the event which would take Mr. Wilson to Oxford would leave in India another distinguished member of your Society, my excellent friend Dr. Mill, whose presence alone prevents me from expressing of himself praise as



fervent and sincere as that which with a willing ear he has heard of his rival in a generous contest. Gentlemen, though I have disclaimed, as I was bound to do, all acquirement or ability in the department of Oriental Literature, I will not pretend to entertain so humble an opinion of the results of a life which has at least been a studious and thoughtful one, as that there is no province of study in which I might have hoped to gather offerings which I should not have been ashamed to present to you. But here in vindication of my own consistency, and to shew at least that I dealt fairly by you in accepting the office of your President, I beg leave to recall what none of you are likely to recollect, that seven years ago, upon another public occasion, in taking leave of a Society at Madras, of which also I was President, I bade adieu at the same time to all literary employment, so long as I should fill the station to which I was called in Bengal. I foresaw that it would impose upon me a predominant duty, and one of which the most peculiar features are not perhaps the most obvious, and to which I knew my own mind too well to think I could give a divided attention. How I have performed that duty, this is not the place, neither is it for me, to say: but I will say, that to perform it aright, in its most important and essential particulars, has been the earnest and engrossing purpose of my soul. I do not look for a fair estimate in the present day. I have never weighed appearances against realities in the scale of popular applause. But time will declare it; and I am willing to abide the judgment of time. All that I desire at present is to offer the duties of my station to your consideration, as some apology for what might otherwise appear a neglect of what you had a right to have expected of me. From that station and those duties I have now retired, and I have to regret, that the leisure which I thus obtain can no longer be employed either in your service or your company. But in that studious retirement, which, I devoutly hope, awaits the latter portion of my life, I shall to the end of that life be proud that I have borne the name of your President, and I shall recollect with gratitude both the favor which conferred on me that honor, and the indulgence which has been attendant on my tenure of it."

The President sat down amidst a general demonstration of feeling on the part of the members, to which Sir Edward Ryan gave expression in the following reply:

"SIR,—I am requested by the members who are present, to express to you their feelings on this, I may truly say, sorrowful occasion. I wish they had selected some one more competent to be the organ of their thoughts and wishes, but at the risk, nay with the certainty of being unable adequately to express the feelings which your eloquent address has excited in their minds, I cannot decline the honor, for so indeed I consider it, which they have conferred upon me.

"For more than five years, Sir, you have filled that chair, and during the whole of that period, I repeat with confidence, you have evinced the deepest interest in the welfare of our Society—you have never willingly absented

yourself from our meetings—and you have taken an active and diligent part in the duties which devolve on your station amongst us. During this period, we have been indebted to your munificence, for a splendid addition to our Museum, of an extensive cabinet of minerals and geological specimens; and this night you have made a valuable addition to our Library, by the Books which are now before us. You have never lost sight of us in your occasional visits to different parts of India, and from the Himalaya and Penang you have added to the valuable collection, which we had received from you, specimens collected with your own hands. By your kindness, courtesy, and hospitality to those strangers whom science or literature may have guided to the shores of India you have shewn the respect we bear to their attainments.

“ Sir, half a century has nearly elapsed since this Society was founded by one who was then a Judge of the Court in which you so recently presided. I mean of course that great and good man Sir William Jones, to whose memory we cannot revert without the deepest sentiments of veneration and esteem. Many distinguished persons have since filled that chair, a proud distinction to any man: but I speak with sincerity my own feelings, and those I believe of the gentlemen around me, when I say, that, great as were the acquirements of many of your predecessors in their various paths of knowledge, the lustre which they have thrown over that chair has been brightened and enhanced by you.

“ I must no longer trespass on your time, but permit me to hope, that on your return to your native country, it may be some satisfaction for you to know, that you bear with you the respect, the esteem, and the regard of this body, over whom you have so long presided.”

The Acting Secretary was directed to take the usual steps for bringing before the Society, as soon as possible, the subject of the election of a President to fill the vacant chair.

## 2.—NATURAL HISTORY SOCIETY OF THE MAURITIUS.

*Tuesday, 20th December.*

M. J. V. Sganzin forwarded 17 stuffed birds from Ste. Maria Madagascar.

Letters from the following parties, acknowledged the receipt of honorary diplomas: the Rev. J. Adamson, D. D. Cape; Sir W. E. Parry, R. N. F. R. S. New Holland; Sir John Jamison, K. C. V. Sydney; Andrew Smith, Esq. M. D. M. N. S. Algoa Bay; Le fébure Marcy, Mahé, Seychelles Islands.

Other letters were submitted.

The following works were added to the Library—Annual Report of the Agr. and Hort. Soc. of Sydney; Journal des îles de France et de Bourbon, 1786-91.

M. Lislet Geoffroy presented a specimen of Bark obtained from a native chief in Madagascar, in 1815.

M. C. Telfair, Pres. offered in the name of Capt. Trotter, of the Corvette *Curlew*, a black *Ibis* of Agaléga; also some sea Cocos from the Praslin Isle, which he was desirous to introduce in the colony. Also, for the Library, a description of the Isle of St. Paul, with two views by Mr. Pollock.

The President announced that Mr. Hampton had commissioned from Madagascar two pair of crows, to attempt their multiplication on the Island.

Mr. W. Boyer presented a list of objects collected and lodged in the Museum by 15 of his pupils since the 1st August.

Mr. Lienard, sen. read a note on a new species of *zanclus*, differing from that delineated in Cuvier, having one filament less in the dorsal fin, and one thorny ray in the pectoral fin.

Mr. J. Desjardins read the description of two new species of *chétodons*, a fish vulgarly called *pavillons* in the Island, as is the *zanclus* mentioned above. He gives them the names of *chetodon queue d'or*, [*chétodon chagsuries*,—J. DESJ.] and le *C. Joyeux* [*chét. festinus*, J. DESJ.]

The following gentlemen were proposed as honorary members—MM. Ivoneff Dupont, (resident,) F. Eydoux, J. Baume, J. O. Westwood, W. Twining, J. Verreaux, Richard, Dir. Bot. Gard. Bourbon, and J. Goudot, nat. Madagascar.

## VI.—SCIENTIFIC INTELLIGENCE.

### I.—Boring for water in France.

In Mr. Hericart de Thury's recent work on Artesian springs, the following curious fact is noticed relative to the distance to which subterranean currents percolate. A perforation made at Tours, brought up from a depth of 363 feet a quantity of fine sand, and the remains of vegetables and shells. Branches of the thorn were recognized, some inches in length, blackened by their long exposure to the water; also the stalks and roots, still white, of many marsh plants, and the seeds of many plants in a state of preservation, particularly of a species or variety of *Gallium*; fresh water shells were also discovered. It was supposed that the water of this well could not have taken more than four months to traverse its subterraneous course, because the seeds from their fresh state must have fallen on the preceding autumn; and that the supply came from some valley in Auvergne, or Vivarais, which is not so easily proved; but the fact is not the less curious.

In many of the departments of France, funds have been publicly subscribed for the purchase of a set of boring rods: in some, associations have been formed to use them, and great attention is paid to the enumeration of the strata pierced through by the instrument. At a shaft sunk at the Saint Owen gate, near St. Denis, in January 1829, no less than six springs of water were cut through, one stationary, and the five others ascending to different heights.—*Journ. des Savans*, 1831.

### 2.—Meteorological Averages at Canton and Macao.

*Thermometer at Canton, Lat. 23° 12'. N.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Mean.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Noon, ---	64	57	72	77	78	85	85	85	83	77	67	62	74.5
Night, ---	50	49	60	68	72	70	81	78	76	69	57	52	65.1
Highest, --	74	78	82	86	88	90	94	80	88	85	80	70	82.9
Lowest, --	29	38	40	55	64	74	79	75	70	57	40	45	55.5

Mean temperature of Canton, 69.5

*Thermometer at Macao, Lat. 22° 16'.*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Morning,	62	59	66	73	77	82	84	82	81	75	65	62	72.3
Aftern.,	65	59	69	75	78	84	88	85	84	78	68	65	74.8
Highest,	72	71	77	83	85	89	92	90	88	86	80	70	81.9
Lowest,	53	49	55	66	71	74	81	79	76	61	57	57	64.9

Mean temperature of Macao, 73.5

*Fall of Rain at Macao, from 1812 to 1831, in inches.*

1812	1.0	2.6	5.4	6.1	19.8	16.0	12.2	14.1	17.6	6.0	4.3	2.2	107.3
1813	0.8	1.6	1.0	4.2	14.8	13.0	5.8	5.7	5.1		2.2	0.5	54.5
1814		3.1	2.8	5.4	18.6	29.0	11.9	7.2	4.4	4.5	8.8		95.7
1815		From 1st January to 31st December,											64.5
1816		Ditto ditto,											48.8
1819	2.5	3.8	2.7	2.0	8.0	4.2	4.3	18.5	6.0	4.6	1.8	1.1	59.0
1820	1.5	0.3	1.7	3.5	5.0	5.0	7.5	5.8	20.8	13.0	1.0	0.8	65.9
1821	1.0	3.6	2.4	5.0	9.2	10.2	8.0	11.5	2.7	10.5	2.5	2.0	68.6
1822	0.5	0.3	1.2	3.8	17.8	9.1	3.2	7.0	12.6	3.0	4.8	0.3	63.6
1823		0.1	0.6	5.6	1.0	12.8	11.6	7.0	6.0	11.0			55.7
1824			0.8	3.0	6.2	17.9	4.7	4.3	16.7	6.4	7.0	1.6	68.6
1825		0.3	4.0	3.5	8.5	13.4	7.0	13.6	8.2	3.8	1.0	1.0	73.3
1826	1.1	2.4	2.8	18.6	5.8	4.4	11.8	11.5	15.2	3.5	2.7		79.8
1827			2.		9.9	8.7	9.2	16.	3.5	.6	1.5	1.	51.8
1828	.1	1.4	3.6	11.1	22.8	17.4	10.9	10.0	16.2	5.9	0.2	4.6	104.6
1829	2.4	5.1	1.4	10.1	12.1	4.2	4.1	9.2	8.8	1.0		0.8	59.3
1830		0.5	1.0	0.4	4.4	4.6	7.1	10.3	19.4	5.3	1.0		52.9
1831		1.2	0.9	6.6	25.6	7.7	4.5	7.0	11.7	9.2	0.8		75.3
Mean	0.68	1.67	2.15	5.56	11.85	11.10	7.75	9.90	10.92	5.50	2.47	0.99	
Mean annual rain, inches,													70.0

Rainy days, 3½ 7 6 10 15½ 9 10 12½ 10 5 3 3½

The averages at Canton are taken from the Meteorological Diary of the Canton Register for 1831. Those at Macao are from a private diary by Mr. Blettermen, during the same year.—*Companion to the Anglo-Chinese Kalendar of 1832.*

*3.—Polyzonal Lens.*

We are grieved to learn by a letter from Sir David Brewster to Mr. George Swinton, that there are at present little hopes of the accomplishment of the grand object, towards which the liberality of the lovers of science in India contributed so meritoriously a few years since. The failure of Messrs. Gilbert and Co. Opticians, who had already, it seems, executed one Lens on the Polyzonal principle for the Light-house Board, under the Dr.'s directions, had delayed further proceedings: and although the Firm was again established, the loss of all their tools and apparatus rendered it impossible for them to undertake the job at the price before settled, namely £80. Dollond and Co. would not attempt it under £400. Having experienced in these disastrous times the greatest difficulty in getting subscriptions from scientific men, Sir David had made a formal application to Lord Althorpe for some public aid, but this



also was refused from the state of the revenue. Sir David fears therefore that he shall be obliged to re-transmit the sum subscribed towards the Lens in India. This would indeed be a mortification, and we cannot help thinking, that if the grand Polyzonal Lens can really be completed at an expence of £120, the patrons of science in India would rather make up the whole sum required than abandon, on such an unworthy consideration, an experiment of national and universal interest.

#### 4.—Litharge of Ava.

In the examination of Ava minerals, printed in No. I. of this Journal, I expressed some doubt as to whether a specimen of crystallized litharge there described was a natural ore or an artificial product: the following passage in a letter from Major H. Burney sets the matter at rest.

“Mr. Lane, upon further inquiry, ascertained that the litharge was not a natural but an artificial production. It was brought however from the *Shan* territory, and there is always much difficulty in obtaining correct information regarding the productions or proceedings of the *Shan* race.”—*Rangoon*, 4th June, 1832.

#### 5.—Timber Trade in Cachar.

Timbers sold in Cachar are divided into three kinds, called Gúndab, Dúm, and Karí. Gúndabs consists of Jarul only, and are used chiefly in Sylhet for boat building. They are sold at two rates, according to their size. Those timbers which are less than ten *haths* in length and six *múts* in circumference are called Pyah, and are worth about 27½ Rupees each on an average; but those above that size are sold by the *khálf*, which is a measure derived from a rude and inaccurate mode of estimating the cubic contents of the timbers, in which they are assumed to be regular parallelopipedons, thus: 10 *haths* X 6 *múts* X 6 *múts*, 360 parts, of which 250 make a *khálf*; the value at present of which is about 3 Rs. 6 annas. Six *múts* make a *bath*, and the *bath* is equal to 20 inches.

The following table includes various kinds of timbers used chiefly for posts, beams, and small boats. The prices of these are in proportion to their size, but may be stated just now as here given:—

Nagísar, Cham, Awal,	}	25 haths by $3\frac{1}{2}$ haths in cir. from 10 to 12 Rupees each.		
Teylo, Súnid, Morye, Gandrú, Gamér,			}	25 hauts by $3\frac{1}{2}$ hauts in cir. from 9 to 11 Rupees.
Sílratta, Sepai, Gandí, Jam, Chika,				

Karí, consists of smaller trees running from 9 to 12 *haths* in length, which are sold in lots at from 1 to 1½ *cawns* per *bath* measured on the girth. The following are included in this class:

Ratta, Pumar, Karil, Kurta, Jokí, Singra, Chatní, Singtajah, Singdrine, Harís, Puarí, and many others.

Ratans, Jali Bét, 7 Rs. pr. 100 muras (of 75 béts each). Sándi Do. one quarter higher.

Gala ditto, the large kind running from 80 to 120 feet in length, is unsaleable, and therefore only cut to order.

The prices above-mentioned are now current in Kachar; in addition to which the following duties are charged on the transit of the different articles to Sylhet.

	Rs.	a.	p.
On Gúndahs,	0	6	6
On Dúms and Káris, from	0	6	0 to 1 0 6 each.
Ratans, from	2 to 3	rupees per 100 murals.	

The expence of floating the timbers from the forest to Banga is about 1 R. 4 as. per score, and about the same sum is charged for conveying them to Sylhet; but this expence is more than compensated by the sale of the bambus given gratis by the wood-cutters to form the rafts.

As Jarul is used only in Sylhet, for the construction of large chunam boats, the trade in that article has fallen off greatly of late, in consequence of the stagnation in the lime business, and the annual demand therefore does not now exceed two thousand timbers, which is about one-half the number formerly exported.

From 1500 to 2000 Dúms and Káris form the amount exported of those classes.

Jarul is seldom carried beyond the district of Sylhet in logs, in consequence of the difficulty of floating the timbers across so large a river as the Megna; it is sometimes exported in planks, but more commonly is worked up at Azmeri-ganj, Chattak, and Sanam-ganj into boats, for which, on account of its buoyancy, it is eminently fitted.

A Jarul boat well smeared with bélal will last with occasional repairs about 10 or 12 years, and one of twelve hundred maunds burthen may be built in Kachar for about 350 Rupees. Of the trees sold as Dúms and Káris, there are many which are very strong and durable woods, fit for building and furniture, but which have not yet been introduced to a fair market in consequence of the want of enterprize and capital of the traders.

It is further probable, that as the forests have never been thoroughly examined by any intelligent European, we are still ignorant of many valuable productions which they contain. Besides the Oak and Tún, Chumal, (well fitted for furniture,) Wild Nutmeg, Cinnamon, and Clove trees have, it is said, been seen in them.

T. F.

## VII.—*Recommendations of the Sub-Committees of the British Association for the advancement of Science.*

An abstract of the Proceedings, and a first Report, of the grand Association convened at York in the autumn of 1831, has been published in the Philosophical Magazine of last March. As the suggestions drawn up are of general application, we lose no time in giving them circulation in



India. From an observation under the head of Hygrometry we are glad to find, that Indian labours receive their full share of consideration. There are many points among the desiderata, such as the gradation of temperature with altitude, the diurnal oscillations of the barometer, &c., which are peculiarly easy of elucidation in this climate; and we trust that they will be taken up by some of our friends at *Dehra Dún, Chirra Punjí, &c.* The Association proposes to supply delicate instruments for these observations, and in this respect it might certainly render us eminent service; for it may safely be stated that there is not a standard thermometer or barometer in the country, which can be trusted to reduce our results to terms of a known instrument at home.

It must be confessed, that at first sight the manner in which this new Society proposes to promote the cultivation of the sciences does not appear commensurate with the éclat and grandeur of its foundation; it exerts its persuasion on men eminent in various sciences, to perfect essays and experiments upon which in many cases they state themselves to be already engaged; it invites reports upon the recent progress of every branch of science, but these surely would have been furnished without any such recommendation, and publication would have been ensured free of expence to the authors through the numerous Societies and Periodical Journals already devoted to each division of knowledge. The reports are stated to be only preliminary to measures hereafter to be adopted for advancing and directing future investigations: but the members of such an association composed, as it must be, chiefly of scientific men, are surely aware whither to direct their researches, and unless substantial prizes and rewards are offered, who among them will readily quit the train into which he may have been drawn by taste or circumstances, to pursue a new course of study? A wide class of observers of what is called "the lower order of facts," in Meteorology, Botany, and Zoology may be created, and if well directed, their efforts may certainly prove of great utility; but for the refined examination of the first data of chemistry, of the abstruse questions of mathematical analysis, of astronomical problems, &c. the spontaneous labours of the habitual and secluded devotee will ever command more reliance than the hurried and ostentatious productions of commissioned students and experimenters. We observe that most of the general recommendations of the Society have been zealously taken up by the parties invited to prepare reports for the next meeting; we shall thus have a series of elegant essays, without perhaps much of real novelty, that would not have seen the light as soon in the ordinary way. But although we are not sanguine in our hopes of any brilliant achievement of invention by an association of such a nature, it would be unfair to suppose that it will produce no good results:—"it will cement a general co-operative union of the Philosophical Societies of the country; its publications will form a national catalogue of the scattered particulars of

each science accurately detailed—and if SOCIETIES shall concur in thus meeting each other—in proposing certain common objects—in communicating from year to year the means which they are employing, and the progress which they are making, *it seems impossible* that this should be done in the presence of an assembly concentrating a great part of the scientific talent of the nation, without kindling an increased ardour of emulous activity; *it seems impossible*, that the deputies of any Society should attend such meetings without bringing back into its bosom an enlargement of views, and communicating to its members new lights of knowledge, new motives for inquiry, and new encouragement to perseverance.”

The following are the recommendations of the Sub-Committees, drawn up and circulated after the first meeting.

*Committee of Mathematical and Physical Science.*

*Mathematics.*—The Committee recommend that the Vice-President of the Association residing at Cambridge be requested to use his utmost efforts to procure from some competent individual, a report to the next Meeting on the progress of Mathematical Science.

*Astronomy.*—That Professor Airy be requested to favour the Association with a report on the state and progress of Physical Astronomy, together with such remarks on the improvements of Practical Astronomy as he may deem it useful to add.

*Theory of Tides.*—That J. W. Lubbock, Esq. be requested to furnish a statement of the means which we possess, or which we want, for forming accurate tables for calculating the time and height of High-water at a given place.

*Meteorology.*—That James D. Forbes, Esq. be requested to draw up a report for the next meeting, on the present state of Meteorological Science.

The Committee, considering that the science of Meteorology is in more want than perhaps any other of that systematic direction which it is one great object of the Association to give, has thought it advisable to propose the following points for investigation.

I. That the Association should employ all the means in its power to procure a Register of the Thermometer during every hour of the day and night, to be kept at some military or naval station in the south of England.

*Note\*.*—Until the phænomena and distribution of diurnal temperature are more thoroughly understood than at present, we can hardly hope that any very sure footing has been obtained in the study of Meteorology. The hourly register kept for several years at the military station of Leith Fort in lat.  $56^{\circ}$ , has shown that we want nothing but the combination of a sufficient number of trust-worthy observations, in order to obtain results of primary importance to the science, and which may one day enable us to arrive at the true form of the daily and annual curves of mean temperature, with a precision almost mathematical. In order, however, to extend the benefit of such investigations, it is

\* The notes appended to the Recommendations have been drawn up by some of the members of the Committees since the meeting.

absolutely necessary that they should be pursued in different latitudes. The mode of rendering available registers, otherwise almost without value from not being made at the proper hours, will be best illustrated by a reference to the account of the Leith observations.—*Transactions of the Royal Society of Edinburgh*, Vol. X.

II. That the establishment of such an hourly Meteorological Register be pointed out as a highly interesting object, in reference especially to the important point of intertropical climate, to the Committee of the Association in India.

III. That the Committee in India be requested to endeavour to institute such observations as may throw light on the phænomena of the horary oscillations of the barometer, near the equator. Should the concurrence of the Committee on these points be obtained, it would probably be desirable that the Association should take measures for sending out delicate and accurate instruments.

IV. That Mr. Phillips and Mr. William Gray, jun. of York, be requested to undertake a series of experiments on the comparative quantities of rain falling on the top of the great tower of York Minster, and on the ground near its base. The Committee has been induced to propose this specific question in consequence of the local fitness of the situation, and the facilities offered for its solution by the authorities; but it is to be wished that similar experiments should be made elsewhere, that, by an extended comparison of observations, light may be thrown upon the anomalies which have been observed at Paris and in other places\*.

V. That the Association should express its desire to receive a satisfactory exposition of the theory of the moistened bulb hygrometer, and that observers be also invited to institute series of comparative experiments on the indications of the moistened thermometer and the temperature of the dew point.

*Note.*—These indications may be ascertained by Mr. Dalton's process, or by Mr. Daniell's hygrometer, or by both. Notwithstanding the ingenious and laborious researches of Hutton, De Saussure, Leslie, Anderson, and Gay Lussac upon this subject, scientific deductions drawn from more extended experiments are greatly wanted. The simplicity and certainty of the experiment by which the cold produced by the evaporation of water is measured, renders an accurate theory of the result peculiarly desirable. The experimenter would do well to consult Mr. Dalton's views on the theory of hygrometry, contained in his Meteorological Essays, and in the Manchester Transactions; and to examine the investigations of Professor Leslie, (*Relations of Heat and Moisture*, and Supplement to the *Encyclopædia Britannica*, article *Meteorology*;) of Dr. Anderson, (*Edinburgh Encyclopædia*, article *Hygrometer*,) and of M. Gay Lussac, (*Biot, Traité de Physique*, Tom. II.) A good series of observations at high temperatures will be found recorded in Nos. II. and III. of a Calcutta Journal, entitled *Gleanings in Science*†.

\* The Ochterlony monument would be a favorable position for a peculiar series of experiments in Calcutta.

† Vide also Observations in the *GLEANINGS*, No. VI. page 47 and 189.

VI. That experiments on the decrease of temperature at increasing heights in the atmosphere be recommended as an important subject for the contributions of observers.

*Note.*—Series of observations for considerable periods of time on the mean temperature of the air at fixed hours, and at stations of which the difference of height has been accurately measured, are the most valuable. The best hours for observations are those which give most accurately the mean temperature of the period of observation. The hourly observations at Leith Fort have determined the hours which give the annual mean temperature in this country to be about  $9\frac{1}{4}$  A. M. and  $8\frac{1}{2}$  P. M. Experimental balloons have lately been employed by the Earl of Minto, to assist the solution of this problem, which is one of the most interesting in Meteorology: but the investigation of it is nearly brought to a stand for want of sufficiently numerous observations. The observer may be referred for information to Ramond's *Mémoires sur la Formule Barométrique de la Mécanique Céleste*; to the researches of Humboldt; to Professor Leslie, Supplement to the *Encyclopædia Britannica*, Article *Climate*; to Pouillet, *Elémens de Physique*; to Mr. Atkinson's paper on Refractions, in the Memoirs of the Astronomical Society: and to Mr. Ivory's Memoir on the same subject in the Philosophical Transactions, and his papers in the Annals of Philosophy.

VII. That the observation of the temperature of springs at different heights and depths should be pointed out as an object of great interest, in prosecuting which insulated inquirers may render essential aid to science.

*Note.*—When springs are copious, a few observations in the course of the year suffice to give with great accuracy their mean temperature. The height of the springs above the mean level of the sea, and the depth of Artesian wells, should be carefully observed; and where the corresponding mean temperature of the air can be obtained, it should be stated. In two points of view these observations are important, independently of the inference which they may furnish as to the decrease of heat in the atmosphere. The great interest attached to the phenomenon of the progressive increase of temperature of the globe, as we descend through the strata, renders of value observations on the temperature of springs at considerable heights, of springs in mines, and of those brought to the surface from some depths by the process of boring. This question has been treated with great success by M. Cordier in several memoirs, some of which have been translated into English. Again, the researches of Humboldt, Buch, Wahlenberg, and more recently Kupffer, in a Memoir on Isogeothermal Lines, read before the Academy of St. Petersburg in 1829, have shown that the temperature of the earth differs in many parts of the globe from that of the air, being generally in defect below lat.  $56^{\circ}$ , and in excess beyond it. Artesian wells, and the deviation of the mean temperature of the earth from that of the air in different latitudes, have opened new fields for discussion; and by the zealous co-operation of observers cannot fail to present results, of which at present we can form but an imperfect idea.

*Magnetism.*—It appears to the Committee highly desirable, that a series of observations upon the intensity of terrestrial magnetism in various parts of England be made by some competent individual, similar to those which have recently been carried on in Scotland, by Mr. Dunlop.



Should the Committee succeed in finding some individual ready to undertake the task, they propose that an application should be made to the Royal Society of Edinburgh, for permission to make use of the standard needle belonging to them, and constructed under the direction of Professor Hansteen of Christiana.

It appears to the Committee of considerable importance that a certain number of observations should be made throughout Britain with the dipping needle, in order to reduce the horizontal to the true magnetic intensity.

*Note.*—The time of three hundred vibrations should be observed, and the methods of observation and reduction should be the same as have been employed and described by Humboldt, Hansteen, and others.

*Electro-Magnetism.*—The Committee recommend as an important subject for further prosecution, the examination of the electro-magnetic condition of metalliferous veins. The Committee would refer for the details of what has been already done upon this subject, to the paper of Mr. Fox in the Philosophical Transactions for 1830, and would propose that the experiments should be extended to veins which traverse, as in some of our mines, horizontal and dissimilar strata.

*Optics.*—That Dr. Brewster be requested to prepare for the next meeting a report on the progress of optical science.

*Acoustics.*—That the Rev. Robert Willis be requested to prepare for the next meeting a report on the state of our knowledge concerning the phenomena of sound, and the additions which have been recently made to it.

*Heat.*—That Professor Powell be requested to prepare for the next meeting a similar report respecting heat.

*Electricity.*—That Professor Cumming be requested to prepare for the next meeting a similar report on thermo-electricity, and the allied subjects, in which recent discoveries have been made.

#### *Chemical Committee.*

It appears to the Committee of supreme importance, that chemists should be enabled, by the most accurate experiments, to agree in the relative weights of the several elements, hydrogen, oxygen, and azote, or, which amounts to the same thing, that the specific gravity of the three gases should be ascertained in such a way as would insure the reasonable assent of all competent and unprejudiced judges.

They think it highly desirable, that the doubts which remain respecting the proportions of azote, oxygen, &c. in the atmosphere should be removed; that the proportions of azote and oxygen in nitrous gas and nitrous oxide should be strictly determined; and that the specific gravities of the compound gases in general should be more accurately investigated.

They recommend that the members of this Committee, and British chemists in general, be invited to make experiments on these subjects, and communicate their results to the next meeting at Oxford.

That Mr. Johnston be requested to present to the next meeting a view of the recent progress of chemical science, especially in foreign countries.

That Dr. Daubeny be requested to undertake an investigation into the sources from which organic bodies derive their fixed principles.

That Mr. Johnston be requested to undertake the inquiries which have been suggested to the Committee, into the comparative analysis of iron in the different stages of its manufacture.

That Mr. West be requested to pursue the experiments contemplated by him into the combinations of gaseous bodies when passed through heated tubes.

That the Rev. W. Vernon Harcourt be requested to prosecute the inquiries contemplated by him into the chemical phenomena from which the materiality of what are sometimes called ethereal substances has been inferred.

*Mineralogical Committee.*

The Committee recommend, that the Rev. Professor Whewell be requested to present to the next meeting a report on the state and progress of Mineralogy.

*Geological and Geographical Committee.*

The Committee recommend, that geologists be requested to examine strictly into the truth of that part of the theory of M. Elie de Beaumont, in its application to England, Scotland, and Ireland, which asserts that the lines of disturbance of the strata assignable to the same age are parallel, and that a report to the next meeting on this subject should be procured.

That Mr. Phillips be requested to draw up, with such co-operation as he may procure, a systematic catalogue of all the organized fossils of Great Britain and Ireland, hitherto described, with such new species as he may have an opportunity of accurately examining, with notices of their localities and geological relations.

The Committee propose, that Mr. Robert Stevenson, civil engineer, be requested to prepare a report upon the waste and extension of the land on the east coast of Britain, and the question of the permanence of the relative level of the sea and land; and that individuals who can furnish observations be requested to correspond with him on the subject.

*Note.*—The importance which, especially of late years, has been attached to facts of this nature, in illustration of the sciences of hydrography and geology, and the mass of uncombined materials which have recently been accumulating, have induced the Committee to make the present recommendation; and in doing so, it feels pleasure in being able to have in its view an individual whose practical acquaintance with the coast in general, and more particularly the minute survey made by him some years since, gives reason to expect from his report much important and accurate information.

*Botanical Committee.*

The Committee recommend, that Professor Lindley be requested to prepare for the next meeting an account of the principal questions recently settled, or at present agitated, in the philosophy of Botany, whether in this country or abroad:

That botanists in all parts of Great Britain and Ireland be invited to compose and communicate to the meetings of the Association catalogues of county or other local Floras, with indications of those species which have been recently introduced, of those which are rare or very local, and of those which thrive, or which have become or are becoming extinct, with such remarks as may be useful towards determining the connection which there may be between the habitats of particular plants, and the nature of the soil and the strata upon which they grow; with statements of the mean winter and summer temperature of the air and water at the highest as well as the lowest elevation at which species occur, the hygrometrical condition of the air, and any other information of an historical, æconomical, and philosophical nature.

*Note.*—If upon this plan a complete botanical survey of the British islands could be obtained, the results would be important when the Flora in the aggregate came to be compared with its relations of soil, climate, elevation, &c.



## Catalogue of Indian Birds.

[Continued from p. 267.]

**CINCLOSOMA CAPISTRATUM.** *Cinclos. capite suprâ, genis, pteromatum maculâ rectricibusque ad basin intensè atris; remigum pogoniis externis, rectricum apicibus, tectricibusque alarum fusco-griseis, his fasciâ albd notatis; dorso medio pallidè brunnescenti-griseo; collo in fronte, nuchâ, pectore, abdomineque summo pallide, dorso abdomineque imis saturatiùs, rufis.*

*Rostrum nigrum, pedes flavescences. Remiges interiores, rectricumque mediarum bases rufi. Longitudo corporis, 10; alæ a carpo ad apicem remigis 6tæ, 4; rostri,  $\frac{9}{10}$ ; tarsi,  $1\frac{3}{8}$ ; caudæ,  $4\frac{1}{2}$ .*

**CINCLOSOMA VARIEGATUM.** *Cinclos. strigâ a rictu per oculos extendente, mento colloque in fronte, maculâ pteromatum et mediâ alarum, rectricumque mediarum basibus atris; fronte, strigâ genarum infrâ, pectoreque pallidè albescenti-rufis; notâ pteromatum, abdomine crissoque rufis; capite suprâ, nuchâ, dorsoque brunnescenti-griseis; alarum pogoniis externis, rectricumque mediarum quatuor apicibus cineraceo-griseis; rectricibus quatuor utrinque lateralibus externè flavo-olivaceis, apicibus albis.*

*Rostrum nigrum, pedes rubri. Longitudo corporis, 11; alæ a carpo ad apicem remigis 6tæ, 4; rostri,  $\frac{9}{10}$ ; tarsi,  $1\frac{3}{8}$ ; caudæ,  $4\frac{1}{2}$ .*

**CINCLOSOMA LINEATUM.** *Cinclos. capite suprâ, nuchâ, dorso imo, rectricibusque duabus mediis brunnescenti-griseis; regione post-oculari, dorso summo, corpore infrâ, rectricibusque lateralibus pallescenti-rufis; his fasciâ nigrâ pone apicem album notatis; capitis nuchæque plumis in medio lineis fuscis, pectoris dorsique summi lineis pallidis, per totam rhachium longitudinem graciliter strigatis.*

*Rostrum pedesque flavescences. Longitudo corporis,  $9\frac{1}{2}$ ; alæ a carpo ad apicem remigis 6tæ,  $3\frac{1}{2}$ ; rostri,  $\frac{7}{10}$ ; tarsi, 1; caudæ,  $3\frac{3}{4}$ .*

Genus *Timalia*.

47. **TIMALIA CHIATARÆA.** *Tim. suprâ pallidè brunnescenti, subtilius rufescenti-cinerea; capite corporeque suprâ lineis fuscis striatis; rectricibus fusco obsoletè fasciatis; rostro pallido.*

Longitudo  $9\frac{3}{4}$ .*Gogoye Thrush, Lath.?*

48. **TIMALIA PILEATA,** Horsf. *Pileated Thrush, Lath.*

49. **TIMALIA HYPOLEUCA.** *Tim. suprâ rufescenti-brunnea, subtilius alba; alis rufis; his caudâque subtilius cinereis, rectricibus fusco obsoletè fasciatis; rostro nigro.*

Longitudo  $6\frac{1}{2}$ .

50. **TIMALIA HYPERYTHRA.** *Tim. suprâ olivascenti-brunnea; capite in fronte corporeque toto subtilius-rufis; caudâ supernè fusco obsoletè fasciatâ; rostro pallido.*

Longitudo 5.

Genus *Ixos*.

51. **Ixos jocosus.** *Lanius jocosus, Linn. Jucose Shrike, Lath.*

52. **Ixos Cafer.** *Turdus Cafer, Linn. Cape Thrush, Lath. Le Courouge, Le Va. ill.*

53. **Ixos fulicata.** *Motacilla fulicata, Linn. Sooty Warbler, var. Lath.*

*Traquet noir des Philippines, Buff.*Fam. *Sylviadæ*.—Genus *Iora*.

54. **Iora scapularis,** Horsf. *Scapular Wegtail, Lath.*

Genus *Sylvia*.

55. *Sylvia Hippolais*, Lath. Ind. Orn. *Lesser Pettichaps*, Lath. *Reed Wren*, Lath.  
This is the bird alluded to under Dr. Latham's *Reed Wren*, as an Indian variety called *Tikra* and *Tiktiki*.

Genus *Prinia*.

56. *PRINIA CURSITANS*. *Prin. corpore, suprà pallidè brunneo, fusco striato; gulâ juguloque albis; abdomine rufescente; rectricibus mediis fuscis, omnibus subtùs ad apicem fasciâ nigrâ albo terminatâ notatis.*  
Longitudo 4.
57. *PRINIA MACROURA*. *Prin. suprà grisescenti-brunnea; capite, alis, uropygioque subrufescenti tinctis; subtùs ferrugineo-albida; rectricibus quatuor mediis saturatoribus fusco obsoletè fasciatis, subtùs ad apicem fusco leviter notatis.*  
Longitudo  $5\frac{1}{2}$ .
58. *PRINIA GRACILIS*. *Prin. cinereo-grisea; dorso, alis, caudâque olivascentibus; gulâ, pectore, abdomineque subtùs albidis; rectricibus subtùs griseis fasciâ nigrâ albo terminatâ notatis.*  
Longitudo  $4\frac{7}{10}$ .  
*Foodkey Warbler*, Lath?

Genus *Motacilla*.

59. *MOTACILLA PICATA*. *Mot. capite, collo, corporeque supra nigris; strigâ utrinque superciliari alterâque longitudinali alarum, corpore subtùs, rectricibusque duabus lateralibus albis.*  
Longitudo 9.  
*Pied Wagtail*, Lath. pl. 104.
60. *Motacilla flava*, Linn. *Bergeronnette jaune*, Buff. & *Bergeronnette de printemps*, Buff. *Yellow Wagtail*, Lath.  
This is the Indian bird alluded to by Dr. Latham under the head of *Yellow Wagtail*, called *Peeluck*, which is its Indian name.

Genus *Enicurus*.

(Hitherto considered limited to the Indian archipelago.)

- ENICURUS MOCULATUS*. *En. capite, collo, dorso superiori, pectore, ptilis, remigibus secundariis caudâque intensè atris; frontis notâ latâ, maculis confertis nuchæ et sparsis dorsi, pteromatibus, dorso, imo, abdomine, rectricibus lateralibus, mediarumque apicibus albis; remigibus primariis fuscis; rostro nigro pedibus albescentibus.*  
Staturâ, *En. specioso* æqualis.

Genus *Saxicola*.

61. *Saxicola rubicola*, Temm. *Stone Chat Warbler*, Lath.

Genus *Phœnicura*.

62. *Phœnicura atrata*, Jard. & Selb. *Indian Redstart*, Id.  
*PHÆNICURA CÆRULEOCEPHALA*. *Phæn. atra, abdomine strigâque alarum longitudinali albis; capite pallide cæruleo.*  
Staturâ, *Phæn. communi*.
- PHÆNICURA LEUCOCEPHALA*. *Phæn. corpore apiceque caudæ atris; abdomine, crisso, uropygio, rufis; capite supra albo. Statura Phæn. rubeculæ.*
- PHÆNICURA RUBECULOIDES*. *Phæn. capite, collo, corporeque supra atro-cæruleis, capitis summo splendidiore; abdomine albo; pectore rufo.*  
Staturâ, *Phæn. cæruleocephalæ*.

PHÆNICURA FULIGINOSA. *Phæn. corpore fuliginoso-plumbeo; caudâ rufâ.*  
*Staturâ paullo major quam præcedens.*

Fam. *Pipridæ*.—Genus *Parus*.

63. *Parus atriceps*, Horsf. *Mésange cap-nègre*, Temm.

PARUS XANTHOGENYS. *Par. capite cristato, gulâ, pectore, abdomine medio, strigâ utrinque colli, scapularium maculis, alis, caudâque atris, his albo notatis; dorso scapularibusque virescenti-griseis; genis, strigâ superciliari, maculâ nuchali, abdominisque lateribus flavis.*

*Staturâ præcedentis.*

PARUS MELANOLOPHUS. *Par. griseus; capite cristato pectoreque atris; genarum, nuchæ, tegminumque alarum maculis albis; remigibus rectricibusque fuscis; maculâ sub alis rufâ.*

*Staturâ Par. atro paulo minor.*

PARUS ERYTHROCEPHALUS. *Par. supra pallidè brunnescenti-canus, subtus rufescenti-albus; gulâ, strigâ superciliari, rectricumque lateralium pogoniis externis albis; capite supra rufo; strigâ latâ per oculos ad nucham extendente, thoraceque atris.*

*Staturâ Par. pendulini, Linn.*

PARUS MONTICOLUS. *Par. capite, collo, pectore, abdomine medio, alis, rectricibusque atris; genarum maculâ latâ nuchaliqve parvâ, tegminum remigum secundariorum rectricumque apicibus, et remigum primariorum rectricumque lateralium pogoniis externis albis; abdominis lateribus flavis.*

*Staturâ paulo minor Par. majori.*

Tribus CONIROSTRES.

Fam. *Fringillidæ*.—Genus *Alauda*.

64. ALAUDA CHENDOOA. *Al. suprâ pallidè grisescenti-brunnea, plumis fusco in medio notatis; corpore subtus strigâque superciliari albis; rectricibus brunneis, duarum utrinque lateralium pogoniis externis albis; pectore brunneo maculato, capite cristato.*

*Staturâ Al. arvensis, Linn.*

65. ALAUDA GULGULA. *Al. pallidè rufescenti-brunnea, plumis in medio latè et intensè brunneo lineatis; subtus albescens, pectore brunneo lineato; femoribus rufescentibus; rectricibus brunneis, externâ utrinque ferè totâ, secundâ pogonio externo, albis.*

*Staturâ ferè præcedentis.*

Genus *Mirafra*.

66. *Mirafra Javanica*, Horsf. *Alouette mirafre*, Temm.

67. MIRAFRA PHÆNICURA. *Mir. pallidè cinereo-brunnea; corpore subtus, remigum pogoniis internis, rectricumque basi rufis; rostro albo, culmine apiceque fuscis.*

*Longitudo 5.*

Genus *Emberiza*.

68. *Emberiza Baghaira*. *Baag-geyra Lark*, Lath.

This bird is the common *Ortolon* of India, called *Baghairi*.

69. *Emberiza Gingica*, Gmel. *Duree Finch*, Lath.

70. *Emberiza cristata*, Gould's Century of Himalayan Birds.

71. *Emberiza Bengalensis*. *Baya Berbera*, Asiat. Res. *Loxia Bengalensis*, Linn.

The Hindu name of this bird is *Baya*; its Sanscrit name *Berbera*.

EMBERIZA CRISTATA. Mas. *Emb. capite cristato corporeque atris ; alis caudâque rufis.*

Fœm. aut Mas jun. ? *Capite subcristato corporeque fuscis, abdomine imo pallidiori ; alis caudâque rufescentibus, fusco tinctis.*

Staturâ *Carduelis communis.*

CARDUELIS SPINOÏDES. Mas. *Card. fronte, occipite, collo corporeque infra, ptilis, pteromatum apicibus, fasciâ remigum, rectricumque lateralium basibus flavis ; capite supra dorsoque olivaceis ; alis caudâque fusciscenti-nigris.*

Fœm. ? *Coloribus minùs saturatis ; abdomine dorsoque olivaceo-fusco striatis.*

Staturâ paulò major quàm *Card. Spini.*

CARDUELIS CANICEPS. *Card. brunnescenti-canus ; alis caudâque nigris ; circulo angusto frontem rictum gulamque circumcingente coccineo ; fasciâ alarum aureâ ; thorace, maculi paucis alarum, uropygio, abdomine imo, crisso, rectricum externarum pogoniis internis, mediarumque apicibus albis.*

Staturâ *Card. communis.*

#### Genus *Fringilla.*

72. *Fringilla Amandava*, Linn. *Le Bengali Piqueté*, Buff.

73. *Fringilla formosa*, Lath. *Lovely Finch*, Lath.

74. *Fringilla Malabaria*, —. *Loxia Malabaria*, Linn. *Malabar Grosbeak*, Lath.

75 FRINGILLA FLAVICOLLIS. *Fring. suprâ cinereo-grisea, subtus albida ; jugulo maculâ flavâ notato ; humeris ferrugineis ; alis maculis albis fascias duas exhibentibus notatis.*

Longitudo  $5\frac{3}{4}$ .

This bird, though placed amongst the *Finches*, differs in the form of its bill, and it may perhaps hereafter be found expedient to remove it.

FRINGILLA RODOPEPLA. *Fring. suprâ brunnea ; capite, nuchâ, dorsoque lineis fucis rosaceoque nitore notatis ; strigâ utrinque superciliari, gulâ, thorace, maculis alarum, uropygio, corporeque subtus rosaceis.*

Longitudo circiter 7 uncias.

FRINGILLA RODOCHROA. *Fring. supra brunnea ; capite, nuchâ, dorsoque lineis fuscis, illo rosaceo tinctis ; fronte, strigâ utrinque superciliari, gulâ, pectore, corpore subtus, uropygioque rosaceis ; alis immaculatis.*

Longitudo circiter  $5\frac{1}{2}$  uncias.

#### Genus *Coccothraustes.*

*Coccothraustes icteroides*. Mas. *Cocc. capite, jugulo, dorso medio, alis, femorum tectricibus, caudâque atris ; nuchâ uropygio, corporeque subtus luteis.*

Fœm. *Olivaceo-cana, uropygio abdomineque lutescentibus ; remigibus rectricibusque atris.*

#### Genus *Ploceus.*

76. *Ploceus Philippinus*, Cuv. *Philippine Grosbeak*, Lath.

Fam. *Sturnidæ*.—Genus *Pastor.*

77. *Pastor roseus*, Temm. *Rose-coloured Thrush*, Lath. *Le Rosein*, Le Vaill.

78. *Pastor tristis*, Temm. *Merle des Philippines*, Buff.

79. *Pastor griseus*, Horsf. *Le Martin gris de fer*, Le Vaill.

80. *Pastor Contra vel Capensis*, Temm. *Etourneau Pic*, Buff.

81. *Pastor Pagodarum*, Temm. *Le Martin Brâme*, Le Vaill.

Fam. *Corvidæ*.—Genus *Corvus*

82. *Corvus Corone*, Linn. *Carrion Crow*, Lath.

This bird appears to be the common *Carriion Crow* of India; it differs only in size from the *European Crow*, and in the greater elevation of the bill.

Genus *Coracias*.

83. *Coracias Bengalensis*, Linn. *Blue Jay* from the *East Indies*, Edw.

Genus *Pica*.

84. *Pica vagabunda*, Wagler. *Rufous Magpie*, Hardw.

Genus *Garrulus*.

*GARRULUS LANCEOLATUS*. *Garr. vinaceo-badius*; capite subcristato, gula, jugulo, alisque atris; collo anteriori albo, lanceolati; pteromatibus remigibusque cæruleo fasciatis, illis albo terminatis; cauda cærulea, nigro fasciatâ, fasciâ lata apicali albo terminatâ notatâ.

*GARRULUS BISPECULARIS*. *Garr. pallidè badius, uropygio crissoque albis*; maculâ luteâ postrectali, caudâ, pteromatibus, remigibusque atris; his duabus cæruleo fasciatis.

*GARRULUS STRIATUS*. *Garr. pallidè brunneus, subtus pallidior*; corporis superâ subtusque plumis in medio albo longitudinaliter striatis; cristâ verticali remigibus, rectricibusque unicoloribus.

This latter species was observed to deviate in general colour and markings from the *European species*, although according in form; and in the former characters to exhibit a manifest approach to the *nut-crackers* or the genus *nucifraga* of *Brisson*.

Genus *Nucifraga*.

*NUCIFRAGA HEMISPILA*. *Nuc. castaneo-brunnea*; capite subtus, collo anteriori, dorso, pectoreque albo maculatis; capite summo, alis, rectricibusque intense brunneis; his, duabus mediis exceptis, ad apicem luteis albis.

This new species, in the shape of the bill, is shorter and stouter at the base than in the *European species*, and approaches to the *Jays*.

Fam. *Buceridæ*.—Genus *Buceros*.

85. *Buceros Gingianus*, Lath. *Indian Hornbill*, Lath.

There is some confusion with regard to this bird in *Dr. Latham's General History*, under the heads of *Gingi* and *Indian Hornbill*: it is the *Dhanésa* of *India*.

86. *Buceros Malabaricus*, Gmel. *Unicorn Hornbill*, Lath.

There is also much confusion with regard to this bird under the heads of *Fied Hornbill* and *Unicorn Hornbill* of *Latham*: it is the *Dhanésa* of the latter, var. B.

Tribus SCANSORES.

Fam. *Psittacidæ*.—Genus *Palæornis*.

87. *Palæornis torquatus*, Vig. *Psittaca Borbonica torquata*, Briss. *La Perruche à double collier*, Buff.

88. *Palæornis Bengalensis*, Vig. *Psittacus Bengalensis*, Gmel. *Blossom-headed Parakeet*, Lath. sp. 74. var. A.

89. *PALÆORNIS FLAVICOLLARIS*. *Pul. viridis*; capite lilacino-cano, flavo marginato; rectricibus mediis cæruleis apice albo.

Longitudo 12.

According to the description, this would appear to be *Dr. Latham's yellow-collared Parakeet*; but he refers to figures which do not correspond.



Genus *Psittacula*.

*PSITTACULA RUBIFRONS.* *Psitt. viridis*, subtus pallidior; fronte, dorso imo, rectricumque tectricibus coccineis; remigibus caudaque viridi-fuscis, rostro subelongato rufo.

Staturâ paullò major quàm *Psitt. Galguli*.

Fam. *Picidæ*.—Genus *Bucco*.

90. *BUCCO CANICEPS.* *Buc. gramineo-viridis*; capite, nuchâ, collo, pectoreque griseis; illius plumis in medio albido lineatis; rostro rubro; pedibus flavis; regione circumoculari nudâ flavescenti-rubrá.

Longitudo 10.

*Fichtel's Barbet*, Lath.?

This bird is the *Bara-Basanta* of India, and appears to be the same as var. A. of Dr. Latham's *Fichtel's Barbet*.

91. *Bucco Philippinensis*, Gmel. *Barbu des Philippines*, Buff.

Genus *Picus*.

92. *Picus Bengalensis*, Linn. *Bengal Woodpecker*, Lath.

93. *Picus Mahrattensis*, Lath., Ind. Orn. *Mahratta Woodpecker*, Lath.

*PICUS HYPERYTHRUS.* *Mas. Pic. corpore suprâ nigro, albo-maculato, subtus rufescenti-badio*; capite crissoque coccineis; strigâ utrinque per oculos extendente albâ; mandibulâ superiori nigrâ, inferiori albâ.

Fœm. *Capite nigro albo-lineato*.

Staturâ *Pic. mediî*, Linn.

*PICUS OCCIPITALIS.* *Mas. Pic. viridis, uropygio lutescenti*; fronte coccineo; vertice strigâ latâ occipitali ad nucham extendente, alterâque utrinque sub oculos postrictali atris; remigibus rectricibusque fusco atris, parum duabus mediis pallido-fusco striatis, illis externè albo maculatis; gulâ genisque canis. Fœm. *Fronte atrâ albo lineatâ*.

*PICUS SQUAMATUS.* *Pic. suprâ viridis, uropygio sublatescent*; gulâ juguloque viridi-canis; capite coccineo; strigâ superoculari, abdomineque viridi albis, hoc atro squamato; strigâ superciliari alterâque utrinque mentali atris; remigibus rectricibusque fusco atris, illis externè, his utrinque albo maculatis.

*PICUS SPILOLOPHUS.* *Pic. dorso alisque sanguineo-coccineis*; subtus sordidè albus, fuscescenti undulatus; capite colloque nigris, guttis albis maculatis; hujus maculis grandioribus; remigibus caudaque fuscis, harum pogoniis internis albo maculatis.

Longitudo corporis,  $11\frac{3}{4}$ .

*PICUS MODESTUS.* *Pic. suprâ ater, alis ad latera apicesque subrufescentibus*; capite in fronte genisque obscurè coccineis, occipite, gulâ, jugulo, colloque grisescenti-atris, plumis maculâ minutissimâ albâ ad apicem terminatis; rectricibus duabus mediis elongatis.

Longitudo corporis, 15; alæ a carpo ad apicem remigis 4tæ, 6; caudæ, 6; tarsi, 1; rostri,  $1\frac{1}{2}$ .

*PICUS AURICEPS.* *Mas. Pic. capite supra aureo*; occipite, abdomine imo, crissoque coccineis; colli parte posteriori et strigâ utrinque laterali, corporeque supra nigris; colli parte frontali et lateribus, corporeque infra albis, hoc nigro striato; scapularibus, pteromatibus, remigibus, rectricibusque lateralibus albo-maculatis; dorso medio griseo, albo nigroque fasciato.

Fœm. *Sine notâ coccineâ occipitali*.

Staturâ *Pic. mediî*.

*PICUS PYGMÆUS.* *Mas. Pic. capite supra dorsoque medio griseo-canis, hoc albo nigroque fasciato*; strigâ utrinque per oculos ad nucham extendente, gulâ, maculisque pteromatum remigum et rectricum lateralium albis; pectore abdomine-

*que albescentibus, fusco graciliter striatis; notâ longitudinali gracili utrinque post oculos coccineâ.*

Fœm. *Sine notâ coccineâ postoculari.*

Staturâ minor quam *Pic. minoris.*

Fam. *Certhiadae*.—Genus *Sitta*.

94. *SITTA CASTANEOVENTRIS*. *Sit. supernè griseo-plumbea; pectore abdomineque castaneis; strigâ a rictu per oculos ad nucham extendente, remigibus, rectricumque pogoniis internis nigris; gulâ maculâque rectricum lateralium albis.*  
Longitudo 5.

*Ferruginous-bellied Nuthatch, Lath.?*

Genus *Certhia*.

95. *CERTHIA SPILONOTA*. *Certh. suprâ griseo-fusca, albo maculata; capite albo graciliter striato; gulâ abdomineque albidis, hoc fusco fasciato; caudâ albo fuscoque fasciatâ.*

Longitudo  $5\frac{1}{2}$ .

The tail of this bird is soft and flexible, in which respect it differs from the type of the genus; but it agrees in all others.

Genus *Upupa*.

96. *Upupa minor*, Shaw. *La Huppe d' Afrique, Le Vaill.*

Fam. *Cuculidae*.—Genus *Leptosomus*.

97. *Leptosomus Afer*. *Cuculus Afer*, Gmel. *Edolian Cuckow*, Shaw.

Genus *Cuculus*.

98. *Cuculus canorus*, Linn. *Common Cuckow*, Lath.

This bird, on comparison with the *common Cuckow*, differs so little that it can scarcely be called a variety; it is the *common Cuckow* of India, and its habits and note resemble those of the European bird.

99. *Cuculus fugax*, Horsf. *Bychan Cuckow*, Lath.

The common Indian name of this bird is *Pipihâ* or *Pipeeha*, from its note; in Sanscrit *Chataca*. Dr. Buchanan named it *Cuculus radiatus*.

100. *Cuculus Sonneratii*, Ind. Orn.? *Le petit Coucou des Indes*, Sonn.? *Sonnerat's Cuckow*, Lath.?

Not having either specimen or figures to refer to, I conclude, from description alone, that this bird is *Sonnerat's Cuckow*.

Genus *Centropus*.

101. *Centropus Philippensis*, Cuv. *Coucou des Philippines*, Buff. *Chestnut Coucal*, Lath.

Genus *Lampromorpha*.

*LAMPROMORPHA AMETHYSTINA*. *Lamp. suprâ splendide amethystina; abdomine albo, fasciis viridi-amethystinis ornato; rectricibus lateralibus albo notatis.*

Longitudo  $7\frac{1}{4}$ .

This description is taken from a bird in the state of change, the amethystine feathers on the back, tail and breast, appearing partially through a ferruginous ground, but sufficiently numerous and defined to indicate the adult plumage. A younger bird in the collection has nearly the whole of the upper body ferruginous, with an amethystine feather here and there breaking out. In a note appended to the description of the species, Mr. Lindsay states that the natives considered them of extremely rare occurrence.

The male exhibited of this species was observed to have the two middle tail feathers elongated beyond the rest, and the lateral feathers were shown to be altogether soft and flexible, like those of the genus *Picumnus*, Temm.

This bird is the *Mahooka* of India, so named from its note; it is called also, by the English, *Pheasant Crow*. Dr. Latham's *chestnut Coucal* very accurately describes it, but his figure is bad; having apparently been taken from a drawing of Gen. Hardwicke's, which stated it to be a young bird. Dr. Buchanan named it *Cuculus castaneus*.

Genus *Eudynamys*.

102. *Eudynamys Orientalis*. *Cuculus Orientalis*, Linn. *Eastern black Cuckow*, Lath. *Coucou noir des Indes & Coukeel*, Buff.

This bird is the *Coel* of India, and the *Coukeel* of Buffon.

103. *Eudynamys Sirkee*. *Centropus Sirkee*, Hardw. *Sirkeer Cuckow*, Lath.

## Tribus TENUIROSTRES.

Fam. *Meliphagidæ*.—Genus *Chloropsis*.

104. *Chloropsis aurifrons*, Jard. & Selby. *Malabar Chloropsis*, Jard. & Selby.

This bird is the *Hurêwa* of India, and is well described by Dr. Latham as the *Hurruwa Bee-eater*.

Fam. *Cinnyridæ*.—Genus *Cinnyris*.

105. CINNYRIS ORIENTALIS. *Cinn. capite, collo, dorsoque splendide virescenti-purpureis; abdomine purpureo-atro; alis caudæque atris; fasciculo utrinque sub alis aurantiaco.*

Longitudo 4.

*Eastern Creeper*, Lath.

CINNYRIS GOULDIÆ. *Cinn. capite supra, gulâ colloque in fronte, regione auriculari, strigâ utrinque gracili ad latera colli usque ad humeros extendente, uropygio, caudæ tectricibus, rectricibusque duabus mediis elongatis purpureo et cæruleo metallicè splendentibus; capitis lateribus, occipite, nuchâ, scapularibus, dorso summo, ptilisque sanguineo-rubris; dorso imo, pectore, abdomineque sulphureis, his sanguineo sparsis; remigibus rectricibusque lateralibus fuscis.*

Longitudo circiter 5 uncias.

This species has been dedicated by Mr. Vigors to the accomplished artist, Mrs. Gould, who executed the plates of the Himalayan birds.

## ORDO III. RASORES.

## Fam. COLUMBIDÆ.

Genus *Vinago*.

106. *Vinago militaris*. *Columba militaris*, Temm. *Columbar Commandeur*, Temm. *Hurrial Pigeon*, Lath.

Genus *Columba*.

107. *Columba tigrina*, Temm. *Colombe à nuque perlée*, Temm.

108. *Columba Cambayensis*, Gmel. *Colombe maillée*, Temm.

109. *Columba risoria*, Linn. *Colombe Blonde*, Temm. *La Tourterelle Blonde*, Le Vaill.

Le Vaillant mentions a larger bird of this species which is common in Africa; the same thing occurs also in India, where there are two birds differing only in size.

110. *Columba humilis*, Temm. *Colombe terrestre*, Temm.

COLUMBA LEUCONOTA. *Col. capite canescenti-atro; crisso caudæque nigris; nuchâ, corpore subtus, dorso medio, caudæque fasciâ latâ mediâ, albis; tegminibus alarum vinaceo-canis; dorso superiori scapularibusque brunnescenti-canis; remigibus, fasciisque alarum brunnescenti-fuscis.*

Staturâ *Col. Palumbi*, Linn.

## Fam. PHASIANIDÆ.

Genus *Pavo*.

111. *Pavo cristatus*, Linn. *Le Paon*, Buff. *Crested Peacock*, Lath.

Genus *Tragopan*.

112. *Tragopan Satyrus*, Cuv. *Meleagris Satyrus*, Linn. *Horned Pheasant*, Lath.

TRAGOPAN HASTINGSII. *Trag. dorso brunneo-fusco undulato, abdomine intensè rubro, amborum plumis ad apicem nigris in medio albo guttatis; cristâ crissoque atris, illâ ad apicem coccineâ, hoc albo maculato; collo posteriori coccineo; thorace aurantio; regione circum oculari nudâ, carunculisque pendentibus luteis; caudâ atrâ, lutescenti-albo undulatâ.*

This is a second species of the singular group of *Horned Pheasant* (*Meleagris Satyra* of Linnæus), peculiar to India.

Genus *Phasianus*.

**PHASIANUS ALBO-CRISTATUS.** Mas. *Phas. supra ater, viridi nitore splendens; dorso imo albo fasciato; cristæ plumis albis, elongatis, deorsim recumbentibus, basi subfuscis; remigibus corporeque inferiori fuscis; pectoris plumis lanceolatis albescentibus.*

**Fœm.** *Corpore supra cristâque breviori, fusciscenti-brunneis; abdomine pallidior; gulâ plumarumque corporis apicibus et rhacibus albescentibus; rectricibus lateralibus atris, mediis brunneis albescenti undulatis.*

This is the true pheasant, indicated only by former writers from imperfect drawings and descriptions.

**PHASIANUS STACEII.** *Phas. stramineo-albus, supra frequenter, subtilis parcè nigro fasciatus, dorso abdomineque imis rufescentibus; capite cristato fusco; caudâ fasciis latis nigris, ad basin internè rufis, ornata.*

*Longitudo corporis* ab apice rostri ad apicem caudæ, 3 pedes 4 uncias.

**PHASIANUS LINEATUS,** Lath. MSS. *Phas. supra cano-griseus; fasciis gracilibus nigris undulatus; capite, cristâ elongatâ, gulâ, collo anteriori, corporeque infra nigris; abdominis laterum plumis in medio lineis gracilibus albis notatis; caudâ albo nigroque undulatim sparsâ.*

Fam. TETRAONIDÆ.

Genus *Pterocles*.

113. *Pterocles exustus*, Temm. *Ganga ventre-brûlé*, Temm.

Genus *Francolinus*.

114. *Francolinus Ponticerianus*, Temm. *Francolin à rabat*, Temm.

115. *Francolinus vulgaris*, Steph. *Le Francolin*, Buff. *Francolin*, Edw.

Genus *Perdix*.

116. *Perdix picta*, Jard. & Selby. *Painted Partridge*, Id. *Beautiful Partridge*, Lath.

117. *Perdix Hardwickii*, Gray. *Curria Partridge*, Lath.

118. *Perdix Cambayensis*, Temm. *Perdrix rousse-gorge*, Temm.

Genus *Coturnix*.

119. *Coturnix dactylisonans*, Meyer. *Common Quail*, Lath.

This bird is named *Ghagul*; it corresponds with the European species, and is not very common in India.

120. *Coturnix Coromandelica*. *Perdix Coromandelica*, Lath. *Perdix textilis*, Temm. *Caille nattée*, Temm.

This is the most common *Quail* of India, called *Bhuteir*. Dr. Buchanan named it *Perdix olivacea*.

Genus *Hemipodius*.

121. *Hemipodius Dussumier*, Temm. *Turnix Dussumier*, Temm. *Mottled Quail*, Lath.

Fam. STRUTHIONIDÆ.

Genus *Otis*.

122. *Otis Indica*, Ind. Orn.? *White-chinned Bustard*, Lath.?

This bird has usually been considered as the female of the *Otis aurita*, and has been so figured and described; but it is well known to be a distinct bird. It is the common *Leek* of India, called by the English *Bastard Florican*. I am not quite certain that Dr. Latham's *White-chinned Bustard* is the bird, but his description is so near, that I have not thought it proper to make it a new species.

**OTIS NIGRICEPS.** *Ot. corpore supra pallidè badiò, rufo-brunneo graciliter undulato; collo, maculis parvis alarum, abdomineque albis; capite cristato, tectricibus alarum exterioribus, remigibus, notâque grandi pectorali nigris.*

*Longitudo corporis* ab apice rostri ad apicem caudæ, pedes 4; *latitudo*, 4½.

**OTIS HIMALAYANUS.** *Ot. niger; alis albis; dorso medio scapularibusque pallido-rufo, brunneoque variegatis; dorso imo pallido-rufo undulatim sparso; cristæ collique plumis anterioribus et posterioribus confertis, elongatis.*



## ORDO IV. GRALLATORES.

Fam. GRUIDÆ.

Genus *Grus*.

- 123.
- Grus Orientalis*
- , Briss.
- Ardea Antigone*
- , Linn.
- Indian Crane*
- , Lath.

Fam. ARDEIDÆ.

Genus *Mycteria*.

- 124.
- Mycteria Australis*
- .
- Ciconia Mycteria Australis*
- , Hardw.
- Tetaar Jabiru*
- , Lath.

Genus *Ardea*.

- 125.
- Ardea purpurea*
- , Linn.
- Le Héron pourpre huppé*
- , Buff.
- Crested Purple Heron*
- , Lath.

- 126.
- Ardea speciosa*
- , Horsf.
- Darter Heron*
- , Lath.

This bird is without doubt the *Darter Heron* of Dr. Latham; and the *Ardea speciosa* of Dr. Horsfield is, I think, merely the Javanese type of the same bird.

- 127.
- Ardea Torra*
- , Buch.
- Ardea Egretta*
- , Lath. Ind. Orn. var.
- Ardea alba*
- , Linn. var.
- Great Egret*
- , Lath. Indian variety
- Torra*
- or
- Bughletar*
- .

This is the Indian *White Egret*, and it differs only in size from the European species, being somewhat smaller. Dr. Buchanan named it *Ard. Torra*, and when without its filiform appendages on the back, *Ard. Putea*; so that these Indian terms appear to correspond with *Ard. Egretta* and *Ard. alba*.

- 128.
- Ardea Caboga*
- , Penn.
- Caboga Heron*
- , Penn.
- Gibraltar Heron*
- , Lath. var. A.

The term *Caboga* is a corruption of the Indian term *Gao-buga*, *Cow* or *Cattle Heron*, in allusion to its frequently being seen amongst cattle, like the *Gibraltar Heron*.

Genus *Botaurus*.

- 129.
- Botaurus cinnamoneus*
- .
- Ardea cinnamonea*
- , Gmel.
- Cinnamon Heron*
- , Lath.

Genus *Nycticorax*.

- 130.
- Nycticorax Europæus*
- .
- Ardea Nycticorax*
- , Linn.
- Night Heron*
- , Lath.

C. NYCTICORAX MANILLENSIS. *Nyct. supra castaneo rufa; collo in fronte, abdominis lateribus, femorum tectricibus, alarumque tectricibus inferioribus pallidioribus; capite colloque supra nigris, cristæ pennis longis pendentibus albis, apice nigro; pectore abdomine crissoque albis.*

Staturâ paulo major quàm *Nyct. Caledonica*, cui simillima; differt tamen colore cristæ, colli in fronte, tectricumque inferiorum alarum.

Genus *Tantalus*.

- 131.
- Tantalus papillosa*
- .
- Ibis papillosa*
- , Temm.
- Bald Ibis*
- , Lath.

Fam. SCOLOPACIDÆ.

Genus *Rhynchæa*.

- 132.
- Rhynchæa Orientalis*
- , Horsf.
- Cape Snipe*
- , Lath.
- Bécassine de Madagascar*
- , Buff.

RHYNCHÆA CAPENSIS, Sav. *Rhynch. remigibus angustis, fasciis latis flavis sex notatis, infra griseis, nigro-vermiculatis, flavoque fasciatis; secundariarum maculâ pogonii externi, fasciæque pogonii interni, flavis.*

Long. corporis  $9\frac{3}{4}$  unc.: tarsi,  $21\frac{1}{2}$  lin.: digiti unguisque mediî,  $20\frac{1}{2}$  lin.

RHYNCHÆA PICTA. *Rhynch. remigibus sublatiis, externis flavo latè 7-fasciatis, infra griseo-nigroque vermiculatis, interno obsolete flavo-fasciato: secundariarum apicibus, maculâ ultimâ fasciæ-formi pogonii externi, fasciæque pogonii interni, albis.*

Long. corporis  $10\frac{1}{2}$  unc.: tarsi,  $19\frac{1}{2}$  lin.: digiti mediî, 19 lin.

The wing-coverts of both species are spotted with yellow in the young state; and in the adult state are metallic olive with black bands.

Genus *Tringa*.

- 133.
- Tringa ochropus*
- , Linn.
- Green Sandpiper*
- , Penn.

- 134.
- Tringa Glareola*
- , Linn.
- Wood Sandpiper*
- , Penn.

- 135.
- Tringa pusilla*
- , Linn.
- Little Sandpiper*
- , Lath.

- 136.
- Tringa hypoleucos*
- , Linn.
- Common Sandpiper*
- , Lath.



## Fam. RALLIDÆ.

Genus *Parra*.

137. *Parra phœnicura*. *Gallinula phœnicura*, Lath., Ind. Orn. *Red-tailed Gallinule*, Lath. *Poule-Sultane de la Chine*, Buff.

138. *Parra Sinensis*, Gmel. *Chinese Jacana*, Lath.

139. *Parra Indica*, Lath., Ind. Orn. *Indian Jacana*, Lath.

Genus *Rallus*.

140. *Rallus niger*, Gmel. *Black Rail*, Lath.

Genus *Porphyrio*.

141. *Porphyrio hyacinthinus*. *Fulica Porphyrio*, Linn. *Purple Water-hen*, Edw.

## Fam. CHARADRIADÆ.

Genus *Vanellus*.

142. *Vanellus Goensis*. *Tringa Goensis*, Lath. *Vanneau armé de Goa*, Buff.

143. *Vanellus ventralis*. *Charadrius ventralis*, Wagl. *Spur-winged Plover*, Hardw.

144. *Vanellus bilobus*. *Charadrius bilobus*, Gmel. *Bilobate Sandpiper*, Lath.

Genus *Cursorius*.

145. *Cursorius Asiaticus*, Gmel. & Lath. *Courvite de la Côte de Coromandel*, Buff.

Genus *Himantopus*.

146. *Himantopus melanopterus*. *Charadrius Himantopus*, Linn. *L' Echasse*, Buff.

Genus *Charadrius*.

147. CHARADRIUS HIATICULOÏDES. *Char. supra griseo-fuscus; fasciâ frontali alterâ-que verticali, corpore subtus, collarique nuchali albis; linea sub oculis ad aures extendente, fasciâ ad frontem, torqueque pectorali subgracili ad nucham extendente nigris; rectricibus, duabus mediis exceptis, albis, in medio nigro et griseo-brunneo notatis, fasciam semilunarem exhibentibus.*

This bird differs chiefly from the European species in size, being at least one third smaller, and in the narrowness of the pectoral band.

## ORDO V. NATATORES.

## Fam. ANATIDÆ.

Genus *Anser*.

148. *Anser Indicus*, Lath., Ind. Orn. *Barred-headed Goose*, Lath.

149. *Anser melanotos*, Gmel. *Black-backed Goose*, Lath.

150. *Anser Coromandeliana*, Gmel. *Sarcelle de la Côte de Coromandel*, Buff. *Anas Girra*, Hardw. *Girra Teal*, Lath.

Genus *Anas*.

151. *Anas arcuata*, Cuv. *Siley Teal*, Lath.

The name of this bird in India is *Siley* or *Silhei*, from its whistling note; the English call it *Whistling Teal*; it scarcely differs from the Javanese species as figured by Dr. Horsfield.

152. *Anas Crecca*, Linn. *Common Teal*, Lath.

This bird is the *common Teal* of India, and agrees exactly with the British species.

## Fam. COLYMBIDÆ.

Genus *Podiceps*.

153. *Podiceps minor*, Lath., Ind. Orn. *Little Grebe*, Lath.

## Fam. PELECANIDÆ.

Genus *Carbo*.

154. *Carbo fuscicollis*. *Phalacrocorax fuscicollis*, Shaw. *Brown-necked Shag*, Lath.

Genus *Plotus*.

155. *Plotus melanogaster*, Gmel. *Black-bellied Darter*, Lath.

Genus *Sterna*.

156. *Sterna melanogastra*, Temm. *Hirondelle de mer à ventre noir*, Temm.

### IX.—Instructions for collecting and preserving *Coleopterous Insects*.

Under the name of *Coleoptera* are designated all insects with hard wings, such as cockchafers, beetles of various kinds—*Curculio*, *Melolontha*, *Copris*, *Lucanus*, *Cervus*, *Scarabæus*, *Necrophagi*, &c. They are found every where on flowers and leaves, under stones, the bark of trees, moss, and fallen leaves, in rotten wood, old mushrooms, in stagnant water, and among decomposing animal and vegetable matter.

Some interesting species live about the roots of plants, which must be extracted to get at them.

Places where trees have been cut down, should be explored, especially under the logs, and, in the sun, upon the exterior of the timber.

Many insects, in hot climates, hide themselves during the day in the ground, which should be dug up round insulated trees to the depth of a few inches:—the same kind of search should be made along the foundations of walls, &c. The detritus left along the bank of a river, or the sea shore, by retiring water, should be examined. A good number of rare *Carabi* are found on the banks of ponds,—buried in the sand, or concealed under the pebbles of a dry brook. The puddles formed by heavy rain, must by no means be neglected: they abound in interesting insects.

Besides the mode pointed out above, there are various others for collecting quickly a number of insects which live upon plants: thus holding a parasol or a handkerchief under a bush or a branch, and shaking the latter affords a ready method of getting at many curious insects: or a light bag, fitted to a hoop and handle, may be moved rapidly about the extremity of branches while shaken, and the *Coleoptera* will be entangled therein and easily made prisoners.

The *Necrophagi* are not often found in hot climates, where their place is supplied by ants. The way to procure them is to place wide-mouthed bottles, baited with pieces of flesh, out of the reach of ants, that is, hung up in the air, or insulated by being placed in a vessel of water. The smell of the meat will attract the insects.

*Nocturnal Coleoptera* are very rare in collections. To take them, a cloth should be spread towards night in the neighbourhood of a flower bed, and a couple of lamps placed on it: the insects settle upon the cloth where they must be made captive without loss of time. Searching plants in the night is also very productive.

*Coleoptera* should be pinned always *through the right wing*, proportioning the pin to the size of the insect, and taking care not to injure the feet and antennæ.

To save time during the chase, small insects may be put in a bottle, and pinned on return. They do not injure themselves, if a little moss or paper is introduced for them to hold by. In hot climates, the best time for *the chase* is, the morning or the evening. Nevertheless every moment of the day abounds with new species, and a zealous collector will vary the time of his visits abroad. There is no occasion to make long walks: it is better to explore thoroughly a circumscribed space, more especially if a rare individual has been discovered, because it is probable that another may be found in the same locality: there are generally many together.

Besides the travelling box, the collector should have a number of larger boxes for the preservation of his specimens. They should be three inches deep, and the bottom covered with a stratum of cork. In intertropical countries the cork may be replaced by sola, or by various spongy woods.

One box should be devoted to large *Coleoptera*, to avoid the injury their weight would cause to the smaller species if they should get loose in travelling.

Insects should not be put in the magazine boxes until they are dead; they may then be put as close as possible to save space.

When the feet or antennæ prevent the specimens from being closed up, they should be placed for a time in a humid atmosphere, in a covered saucepan with a few drops of warm water, or in moistened sand:—the limbs will then become relaxed, and may be easily brought close to the body, where they must be held by pins until they have dried in the proper attitude.

For preserving *Coleoptera*, pinning is decidedly the best method, it is only large black hard insects that can be preserved in spirits: cotton, sand, sawdust, &c. are of no use whatever.

If a rare insect loses a leg or antenna, it should be carefully wrapped in paper, and pinned by the side of the mutilated animal. It is useless to collect grasshoppers, flies, spiders, or bugs. These insects are very difficult of preservation, often too very large, and therefore only encumber the boxes uselessly.

When a box is sufficiently full of *Coleoptera* firmly fixed with pins, according to the foregoing directions, it should be accurately closed by pasting paper over all the joints, so as to prevent moisture, dust, or other insects from penetrating.

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The above directions are translated from a paper transmitted to the Asiatic Society by a zealous French entomologist, Mons. Petit de la Saussaye, chef du bureau des travaux au Ministère de la Marine, at Paris, who was desirous of obtaining specimens of the Coleopterous insects from India, and who handsomely offered in return, duplicates from his own extensive cabinet. The following extract from M. Petit's letter to the Secretary As. Soc. read on the 4th Jan. may tempt some of our correspondents to comply with his request.

“Amateur zélé de l'étude de l'entomologie, je possède une des collections de Paris les plus riches en coléoptères, famille dont je m'occupe principalement.

Les relations que j'ai avec plusieurs parties de l'Afrique et de l'Amérique me donnent les moyens de faire des échanges avec les musées étrangers, et j'ai osé espérer que vous voudriez bien m'admettre au nombre des personnes qui correspondent de cette manière, avec le célèbre établissement que vous dirigez.

L'avantage que je puis vous offrir consisteroit moins dans la variété des espèces que je vous adresserai, que dans l'exactitude de la classification. Ma collection est nommée d'après le système adopté par M. le Comte Dejean, dont les ouvrages sur les coléoptères sont connus de tous les entomologistes, et les envois que je fais sont classés avec le plus grand soin, ce qui facilite beaucoup à mes correspondants l'arrangement et l'étude des insectes.

De votre côté, Monsieur, il vous seroit bien facile d'enrichir ma collection, car je n'ai presque rien des belles contrées soumises à vos explorations, et les espèces moins rares auroient déjà pour moi le mérite de la nouveauté.”

Collections or letters to M. Petit may be addressed under cover à Mr. le Ministre de la Marine, à Paris.

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*Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of July, 1832.*

Days of the Month.	Minimum Temperature observed at sunrise.				Maximum Pressure observed at 9h. 50m.				Max. Temp. and Dryness observed at 2h. 40m.				Minimum Pressure observed at 4h. 0m.				Observations made at sunset.				Observations in Calcutta, at 10h. 30m. p. m.				Rain Gauge, No. 1.	Rain Gauge, No. 2.
	Barom.	Temper.	Depres. of the air.	M.B. Ther.	Wind.	Aspect of the sky.	Barom.	Temper.	Depres. of the air.	M.B. Ther.	Wind.	Aspect of the sky.	Barom.	Temper.	Depres. of the air.	M.B. Ther.	Wind.	Aspect of the sky.	Barom.	Temper.	Depres. of the air.	M.B. Ther.	Wind.	Aspect of the sky.	Rain Gauge, No. 1.	Rain Gauge, No. 2.
1	29.382	80.7	1.8	1.8	s. e.	rn.	370	83	2.1	3.3	s.	cy.	360	79.7	2.5	3.3	s. e.	rn.	432	78.8	1.4	1.4	s. e.	rn.	0.58	0.40
2	421	78	2.1	2.1	s.	rn.	435	80	2.3	3.3	op.	cy.	397	79.7	2.5	3.3	s.	rn.	432	78.8	1.4	1.4	s. e.	rn.	0.58	0.40
3	451	79.3	2.1	2.1	cn.	rn.	408	80	2.3	3.3	s. w.	cn.	395	86.7	2.5	3.3	s. w.	cn.	414	84.5	3.8	3.8	s. w.	cn.	1.62	1.56
4	432	70.3	1.8	1.8	s. e.	cy.	443	85.5	5.5	4.6	s.	cn.	441	84	4.1	4.1	s.	cn.	433	83.7	2.8	2.8	s.	cn.		
5	500	81.7	3.2	3.2	s. w.	cy.	494	90.3	8.8	7.6	s. w.	cn.	472	90.5	6.5	6.5	s. w.	cn.	469	85	4.1	4.1	s. w.	do.		
6	506	8	2.5	2.5	s. e.	cy.	489	94.5	9.3	8.5	s. e.	cn.	482	85.5	4	4	s. e.	do.	482	85.5	4	4	s. e.	do.		
7	511	82.3	2.8	2.8	do.	do.	489	78.5	1.3	4.6	do.	rn.	489	81.5	3.5	3.5	do.	do.	487	79.5	3.5	3.5	do.	do.		
8	500	78	2.1	2.1	s. e.	do.	494	90.5	7.8	4.5	do.	rn.	476	88	4.5	4.5	do.	do.	488	84.7	3.5	3.5	do.	do.		
9	507	79.7	1.8	1.8	s. w.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.	0.12	0.10
10	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
11	508	80	2.5	2.5	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
12	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
13	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
14	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
15	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
16	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
17	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
18	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
19	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
20	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
21	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
22	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
23	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
24	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
25	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
26	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
27	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
28	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
29	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
30	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
31	507	79.7	1.8	1.8	s. e.	cn.	502	89	8.8	5.6	n. e.	cn.	505	86.3	5.6	5.6	n. e.	cn.	505	83.3	3.1	3.1	n. e.	do.		
Mean	29.489	80.1	2.0	2.0			460	87.3	6.3	5.4			452	83.2	3.5	3.5			452	83.2	3.5	3.5			4.36	4.97

*Abbreviations.* In the column "wind," small letters have been used instead of capitals; *cm.* means calm. In the column "aspect of the sky," *cy.* is cloudy; *cl.* clear; *rn.* rain; *ci.* cirrus; *cu.* cumulus; *cs.* cirro-stratus; *cc.* cirro-cumulus; *n.* nimbus.









